

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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I. Introduction

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 [1]. In Thailand, the No.1 tourism-oriented country in South East Asia, especially on popular isolated islands and beaches, many environmental problems are caused by overtourism [2].

Koh Larn is one of the most popular beach resorts in Thailand and attracts about 10,000 tourists a day, however, local university revealed that the capacity of the number of tourists per day in Koh Larn is about 6,400 [3]. The serious waste problem is caused by overtourism in Koh Larn, and the waste is accumulated at an unofficial dumping site and its total amount is estimated to be about 50,000 tons [4]. So far, however, the government has not enforced any specific solutions.

II. Objective of this study

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. This study aims to calculate the appropriate price of entrance fees and estimated its effects on tax revenue and the amount of waste using Contingent valuation method (CVM), and consider how entrance fees can be introduced. 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 like this study. This study can contribute to the realize of the concept of Sustainable Tourism [5], in terms of that environmental policies are designed with respect to the social and economic aspects of the local community.

III. Methodology

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) toward improvement of the environment. This survey used double-bounded dichotomous choice method, which enable to obtain highly reliable evaluation results with a small number of samples [6]. 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". Respondents were randomly assigned to one of the four groups as follows.

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

Ty = if T1 is YES
Tn = if T1 is NO

Table 1 Proposed prices of WTP (THB)

In order to compare the residents' pros and cons of entrance fees with their personal attributes, 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.

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

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 1 Variables and these definitions

IV. Outline of Field surveys

CVM survey on Feb.2019 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 beaches in Koh Larn and got answers. The language used in the questionnaire was English and it was conducted using a tablet.

A face-to-face questionnaire survey to local residents on Sep. 2019 was conducted on 201 men and women between the ages of 18 and 81. The language used in the questionnaire was Thai.

V. Results

CVM analysis estimated that the median WTP is 403 baht and the average WTP is 626 baht. Assuming that the total number of tourists is 6,400 a day, the revenue from entrance fees on Koh Larn will be 1,048,000 baht (\approx 35,000 USD) per day. This study also estimated that the emission factor for tourists is 2.2 kg / day, and total waste generation can be estimated to be reduced by 7.9 tons, approximately 30% of current, per day.

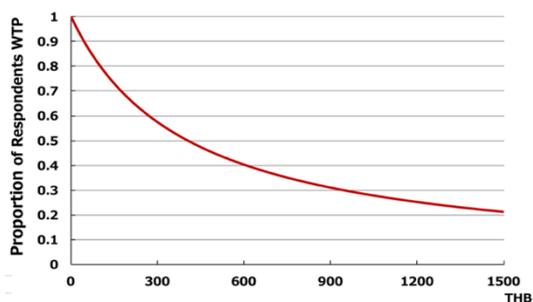


Figure 2 Estimation result of WTP

The questionnaire which was administered to 201 local residents revealed that 96% of the residents had a strong awareness and sense of crises toward the waste problem in Koh Larn, but 67% of them were opposed to the introduction of the entrance fees. As a result of multiple regression analysis, 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.

VI. Conclusion and Policy implication

69% of tourists have noticed the waste problem and 78% of tourists have felt overtourism while sightseeing on Koh Larn. For tourist destinations that use nature as a tourism resource such as beach resorts, decline of tourism satisfaction caused by waste problem or overtourism can trigger the decline of tourist destinations' values. Therefore, it is necessary to control the number of tourists and obtain tax revenues for waste-management system through entrance fees. In national parks in Thailand, entrance fees for Thais are set at about one-fifth lower than those for foreigners. According to the results of CVM, therefore, a setting of about 230 baht for foreigners and about 50 baht for Thai is appropriate on Koh Larn.

To obtain residents' agreement, 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. Further, especially to the elderly and those who are not engaged in tourism, it is important to raise the awareness that overtourism or waste problem will affect not only their living environment, but also the tourism brands of Koh Larn and threaten the sustainability of Koh Larn. It is also important to provide education on the environment and waste issues at schools in Koh Larn.

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