Study on Environment Impact of Tourism Industry in Historical Zone in Meuang District, Nan Province, Thailand

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Abstract— The study investigates residents' perception of environmental impacts of the historical and cultural tourism industry in Meuang district, Nan province, Thailand. Data were collected from questionnaires survey of Nan Province residents from September to October 2017. The questions based on possible positive and negative perception of the residents and satisfaction on tourism sites and attraction requirement in the future. The sample population was divided into two groups. The first group comprises of residents live in the special area for sustainable tourism of Nan Province, Thailand calls historical zone (HS). The second group comprises of residents lives in the non-tourism area (NHS) in Meuang District, Nan Province, Thailand. It was found that the residents' perception between two groups on negative impacts of tourism and satisfactions on tourism sites are significantly different (p<0.05).

Keywords— Environment Impact, Tourism Industry, Nan Province, Thailand.

1. INTRODUCTION

Thailand has diverse tourism destinations which are natural, historical and cultural. The integrity of natural resources and cultural diversity attracts an increasing number of both foreign and domestic tourists. Thai tourism is one of the major drivers of Thai GDP (approximately 9.3% of GDP per capita in 2017) [1]. Tourism industry generates revenue through income, taxes, visitor's fee for environmental conservation, improvement of local services and local government administration, infrastructure development. For the local community, tourism industry generates income and employment opportunity, potential to increase the value of the environment and to spread awareness of environmental problems. These reasons lead to the development of tourism industry. However, tourism development has some adverse impacts on the environment such as natural reserve degradation and pollution. In addition, tourism may change the quality of life of local people and traditional value [2], [3]. Tourism management is necessary to prevent such negative environmental impacts. Phu Tubberk, Petchaboon Province is one case study of how tourism impacts famous natural tourism destination. Most of the tourist travel to this area during the winter season. They generate high amount of solid waste problems [4]. Another case study of how tourism can have negative impacts on environment is the host community at Phra Nakhon Sri Ayutthaya Province that is famous for national historical parks. The negative impacts include

traffic congestion and safety, parking issue within the historical area and air pollutant from transportation [5].

Nan Province is located in the northern part of Thailand. Most of this area is mountainous. Currently, Nan Province has seven national parks. In addition, magnificent Buddhist architectures in this area reflect the cultural and artistic combination of politics, religions, and affiliations in the past. In 2010, Meuang District, Nan Province was selected as a pilot project to develop historical and cultural attractions. As a result, the number of tourists have rapidly increased. Moreover, no study has been conducted on the effects of tourism on the natural environment in Meuang District, Nan Province yet. Thus, this study focuses on environmental impacts from tourism in historical zone in Meuang District, Nan Province, Thailand. Therefore, the objective of this study aims to compare environment impacts from tourism in different areas and to propose management plans which can reduce environmental impacts.

2. ENVIRONMENT IMPACT OF TOURISM

The relationship between environmental and tourism industry is interdependence. Tourism industries receive benefit from good environmental quality and vice versa. Tourism sites cause the authority to measure environment quality in order to maintain and protect tourist resource. In addition, sustainable tourism plan usually tries to do more programs such as the establishment of the conservation area for animal or biodiversity of attraction using part of the tourism revenue to protect and restore environmental attraction or activities for protection, cleaning and improve quality of environment impact on tourist sites [6].

However, the negative impacts occur when tourism development and environment quality do not balance. The environment is damaged by increasing numbers of tourist population. For examples: loss habitats and change biodiversity, pollution problem, overloading of infrastructure, land transfer tourism [6]. The UNESCO (United Nations Educational, Scientific and Culture and

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Organization) assesses the environment impacts of Luang Prabang, Laos (world heritage site) in terms of increasing population, rural to urban migration, rising density and rapidly changing lifestyles. Solid waste, traffic and pollutant, and wetland and waterway problem will occur when a rapid change in this place and overload carrying capacity. [7]

Municipality solid waste generation (MSW) is one of most importance negative impact of tourism on environment including disgusting odours, generation leachate can contaminate the waterway, emission greenhouse gas and vermination and infection disease [8]. All of the problem from solid waste can damage tourism site, especially tourist population during peak tourism periods cause high amount MSW increasing. The study on the impact of MSW generation on Menorca Island, Spain during 1998-2010 found tourist population increase 1% in this area cause MSW increase 0.282% [9].

Air pollutant impact is one impact of tourism from transportation. Transportations emission pollutant from fossil burnt including nitrogen oxide (NO_x), particulate matter (PM_{10}), hydrocarbon (HC) and carbon monoxide (CO). These pollutants impact on environment and human health. Pollutant emission less than 1% of total production from diesel burning. NO_x is the most proportion of pollutant, following PM and minimal CO and HC [10].

The sustainable tourism management shared with local communities. The perceptions and attitude of residents on impacts of tourism development is importance for tourism development for long-term success. The factor effect residents' perceive environmental impacts are community attachment, state of the local economy and demographic profile [11]. In addition, the residents who live in difference area from tourism may have different perceptions of tourism impacts depend on distance from tourism sites. *Jurowski and Gursoy* determined residents who live closest to the tourism attractions perceive negative effect more than resident live far from tourist attraction [12].

3. METHODOLOGY

3.1 Study Site

The study site is in Meuang District (Figure 1). It covers the area of 813.1 km² with 77,952 populations (the year 2017). There are magnificent Buddhist architectures which reflect the blending of Sukhothai, Lanna, Bagan and Lan Chang cultures. Tourist attractions reflect Nan Province history such as Wat Phumin where the temple was built by past governor, Wat Phra That Chang Kam Worawihan where the temple was used for religious ceremonies by past governor. Nan Province has various cultures and traditions such as long-boat racing, Wai Phrathat festival, Namatsakan Phrathat Khao Noi fair, traditional dance, traditional music and local product such as stone toll, ancient porcelain. In 2006, the center of Meuang District, Nan Province was area for conservation and historical town development by government announcement. Meuang District consists of 11 sub-districts which were divided into two areas. The first area is a special area for sustainable and historical

tourism of Nan Province which consists of four sub-districts of Meuang District (Nai Wiang, Du Tai, Na sao and Bo Suak sub-districts). It calls historical zone (HS). The second area is a non-tourism area which is in other sub-districts in Meuang District, Nan Province (NHS) [12].
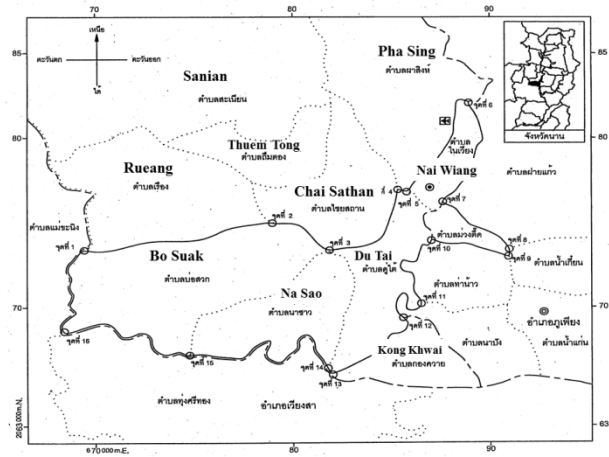

Fig. 1: The special area for sustainable tourism, historical zone, Meuang District, Nan Province, Thailand [13].

3.2 Data Collection

The primary data was conducted by a survey in September to October of 2017 which obtained from 400 sample households together with the calculation from Taro-Yamane method following formula:

$$n = \frac{N}{1 + Ne^2} = \frac{77952}{1 + 77952(0.05)^2} = 397.95$$

The number of sample form calculation is 398 people, so the survey was conducted information 416 of sample residents from each sub-district in Meuang District is shown in Table 1.The respondents are divided into two groups. The first group is respondents who live in the special area for sustainable and historical tourism (HS).A secondary group is respondents who live in a non-tourism area which is in other sub-districts in Meuang, Nan (NHS).The structure of questionnaire used is a set of questions based on residents perceptions and attitude toward environmental impacts of tourism [14], [15]. These questionnaires consist of positive and negative environment impacts of tourism. A five-point Likert-type scale (5 = strongly agree; 1= strongly disagree) was used for questionnaire items shown in Table 2. The questionnaire surveys also ask about the respondents feeling towards tourism sites and develop tourism in the future[8]. The secondary data was collected from statistics of Thai government agencies and local administration that consist of tourist population who traveled to Nan Province, Thailand and pollutant statistics.

3.3 Data Analysis

Results from the questionnaires were compared between the first and the second study groups by mean that are

interpreted with Arbitrary weighting method following Table 3 and independent sample t-test statistics in SPSS program version 16.0 for the following hypotheses:

H$_1$: Local resident between two group's Perception of positive impact of tourism is different.

H$_2$: Local resident between two group's Perception of negative impact of tourism is different.

H$_3$: Satisfacation to tourism site of resident between two group are differrent.

H$_4$: The needs tourism sites in the future between two groups are different.

Table 1. Number of sample residents in each sub-district in Meuang District[16]

No.	Sub-district	Population's Meuang Strict, Nan Province	Sample Size
1.	Nai Wiang	16107	93
2.	Bo	4385	22
3.	Pha Sing	4834	32
4.	Chai Sathan	7568	39
5.	Thuem Tong	3457	17
6.	Rueang	4920	25
7.	Na Sao	3622	18
8.	Du Tai	8490	44
9.	Kong Khwai	5389	28
10.	Bo Suak	6616	34
11.	Sanian	12564	64
	Total	77952	416

Table 2. Statement of environment impact of tourism

Indicator
Positive impact
1. Tourism makes sense to protection and restoration environment quality (+)
2.tourism contribute to conservation of historical building (+)
3.Tourism stimulation environment awareness in historical site (+)
Negative impact
4. Tourism cause noise pollution (-)
5. Tourism cause congestion in town (-)
6. Tourism cause overload litter (-)
7. Tourism cause traffic jam (-)
- What is your feeling of the tourism in your community?
- Would you want more or less tourism site in future in your community?

Table 3. Rules of interpretation by Arbitrary weighting method

Scale	Meaning
4.21-5.00	Strongly agree / Excellent / Much More
3.41-4.20	Agree /Good / More
2.61-3.40	Undecided /Satisfactory/ Same
1.81-2.60	Disagree /Poor / Less
1.00-1.80	Strongly disagree /Very Unsatisfactory/ Much Less

4.   RESULT AND DISCUSSTION

4.1 Demographic Profile of Respondents

Table 4 illustrates the demographic profile of respondents from 416 local residents at Meuang District, Nan Province, Thailand. Two hundred forty-three men (58.4%) and one hundred seventy-three women were surveyed. The age of most respondents ranged from 36-40 years old (47.6% of total respondents). 43.3% of respondents attended or complete bachelor degree, 39% attend the secondary education, 17% receive primary education while 0.8% are illiterate. Majority of respondents are a trader or private business and most of them live in this town for more than fifteen years. Respondents are divided into two groups: historical zone (HS) and non-tourism area (NHS). Some respondents receive income from tourism industry (6.5%) such as guide, tour bus or souvenirs. Most of the respondents do not receive any income from tourism (93.5%). Some respondents who receive income from tourism industry have other income during low season (59.26%).

4.2 Resident Perception of Tourism Impacts

Table 5 showed local resident attitudes and perception impact of tourism. Independent t-test statistics were conducted to determine attitude and perceive tourism impact. Both respondents groups agree tourism help them protect and restore that environment quality, stimulate environment awareness in the historical site (HS, mean=3.97 and 3.80; NHS, mean=3.81and 3.84). On the HS and NHS group of respondents' perception tourism contribute to the conservation of historical building are significantly differences (HS, mean=4.09; NHS, mean=3.85). The NHS respondents perceive three of four of negative environmental impacts of tourism more significantly than the HS respondents. NHS respondents associate tourism cause noise pollution (HS, mean=3.27; NHS, mean=3.75), congestion in town (HS, mean=3.29; NHS, mean=3.90) and traffic jam (HS, mean=3.75; NHS, mean=4.31).The HS and NHS respondents' perception on whether tourism causing overload litter are significantly differences (HS, mean=3.58; NHS, mean=4.09). The summary of residents' perception impact illustrates in Table 6. Two Resident groups agree on tourism industry cause positive impacts. Those are not different and the results fail to support the hypothesis 1. Tourism cause negative impacts were agreed by two groups of residents. Those

are significant different and support that the hypothesis 2 is true (p-value<0.05).

Table 4 Demographic profile of respondents

Variable	HS Group	NHS Group	% of Total
Gender			
Male	98(51.3%)	145(64.4%)	58.4
Female	93(48.7%)	80(35.6%)	41.6
Age			
< 18 Year Old	33 (17.3%)	42 (4.0%)	10.1
18-35 Year Old	42 (22.0%)	76 (33.8%)	28.4
36-60 Year Old	86 (45.0%)	112 (49.8%)	47.6
> 60 Year Old	30 (15.7%)	28 (12.4%)	13.9
Education			
Primary School	30(15.7%)	41(18.2%)	17.1
Junior High School	16(8.4%)	15(6.7%)	7.5
Senior High School	49(25.7%)	26(11.6%)	18
Vocational Certificate /High Vocational	25(13.1%)	33(14.7%)	13.9
Graduate	58(30.4%)	106(47.1%)	39.4
Postgraduate	10(5.2%)	4(1.8%)	3.4
Illiterate or Other	3(1.6%)	0(0%)	0.7
Occupational			
Farmers	21(11.0%)	32(14.2%)	12.7
Freelance	30(15.7%)	48(21.3%)	18.8
Government Officer	24(12.6%)	44(19.6%)	16.3
Officer	11(5.8%)	26(11.6%)	8.9
Business	44(23.0)	55(24.4%)	23.8
Maid	6(3.1%)	4(1.8%)	2.4
Student	37(19.4)	9(4.0%)	11.1
Unemployment	5(2.6%)	5(2.2%)	2.4
Other	13(6.8%)	2(0.9%)	3.6
Monthly income	Baht/Month		
<10,000	85(44.5)	57(25.3%)	34.1
10,001-15,000	37(19.4)	56(24.9%)	22.4
15,001-20,000	19(9.9%)	10(4.4%)	7.0
20,001-50,000	33(17.3)	63(28.0%)	23.1
>50,000	17(8.9%)	39(17.3%)	13.5
Resident Tenure			
>5 Year	16(8.4%)	7(3.1%)	5.5
5-10 Year	13(6.8%)	19(8.4%)	7.7
11-15 Year	39(20.4 %)	29(12.9%)	16.3
<15 Year	123(64.4%)	170(75.6%)	70.4
Not Receive Income From Tourism Industry	172(90.1)	217(96.4)	93.5
Receiving Income From Tourism Industry	19(9.9%)	8(3.6%)	6.5
Receiving Other Income During Low Season	15(78.95%)	1(12.5%)	59.26
Not Receiving Other Income In A Low Season	4(21.05%)	7(87.5%)	40.74

Table 5 Local resident attitude and perceive impact of tourism was analyze by t-test analysis

Indicator	Historical Area			Non-historical Area			T	P
	$\bar{x}$	S.D.	Meaning	$\bar{x}$	S.D.	Meaning		
1.Tourism makes sense to protection and restoration environment quality	3.97	0.96	agree	3.81	0.87	agree	1.79	0.07
2.Tourism contribute to conservation of historical building	4.09	0.96	agree	3.85	0.91	agree	2.62	0.01*
3.Tourism stimulation environment awareness in historical site	3.80	1.04	agree	3.84	1.03	agree	-0.48	0.63
4.Tourism cause noise pollution	3.27	1.19	undecided	3.75	1.17	agree	-4.17	0.00*
5.Tourism cause congestion in town	3.29	1.26	undecided	3.90	1.22	agree	-4.99	0.00*
6.Tourism cause overload litter	3.58	1.22	agree	4.09	1.15	agree	-4.41	0.00*
7.Tourism cause traffic jam	3.75	1.18	agree	4.31	1.02	strongly agree	-5.08	0.00*

*p-value < 0.05
**Reliability scale (α=0.82)

Table 6. Summary of resident's perception

Group	Measurement	HS	NHS
Positive Impact	$\overline{x}$	3.95	3.83
	S.D.	0.87	0.79
	Meaning	Agree	Agree
	T	1.44	
	P	0.15	
Negative Impact	$\overline{x}$	3.47	4.01
	S.D.	1.07	1.02
	Meaning	Agree	Agree
	T	-5.26	
	P	0.00*	

*p-value < 0.05
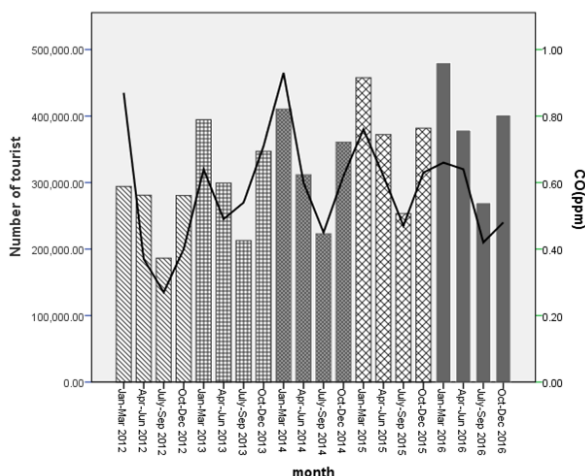
Fig. 2 show relationship between carbon monoxide (average one hour) and tourist population 2012-2016[19] [20].

The resident's perception of negative impact environment of tourism at Meuang District, Nan Province, Thailand was compared the relationship between tourist population and negative impact statistics. In this study, focus on air pollution and solid waste problems. Carbon monoxide is one of the pollutions from fossil fuel burnt. Figure 2 shows the relationship between tourist populations who came to Nan Province, Thailand and carbon monoxide in atmosphere from January 2012 to December 2016. The residents perceive that tourism is causing air pollution related to carbon monoxide statistics. Tourist populations visit Nan Province during January to March which is seasonality and winter season more than another month as same as the concentration of carbon monoxide one hour. *Nwadiogbu* report that the concentration of carbon monoxide depends on the situation of the traffic in the area [17]. The respondents agree that tourism causes traffic jam that is related to the concentration of carbon monoxide, however the concentration of carbon monoxide in this area is not higher than standard value [18]. It does not affect the

resident's health (less than 30 ppm).The population of tourist results on transportation by using private cars due to distance between different tourist attractions. For example, after arrival to travel Meuang District, tourists appear to visit to national park by driving the car because it is more comfortable and convenient.

The relationship between tourist population and solid waste is unclear because solid waste systems in Nan Province consist of sanitary landfills which collect solid waste mass data, but most of the solid waste in this area are incorrectly disposed and are not measured.

4.3 The Satisfactions of Resident about Tourism in Local Tourism

Residents' satisfaction of tourism in local tourism shows in Table 7. Satisfaction of tourism site between two groups is significant differences and support hypothesis 3 (HS, mean=3.93; NHS, mean=3.65). The figure 3 shows frequency of satisfactions where residents who live at HS have a higher level of tourism satisfaction than NHS resident. The residents assess positive and negative impacts of tourism base on what advantage they can receive from tourism industry versus the costs they will incur [11]. HS residents perceive negative impacts less than NHS resident.
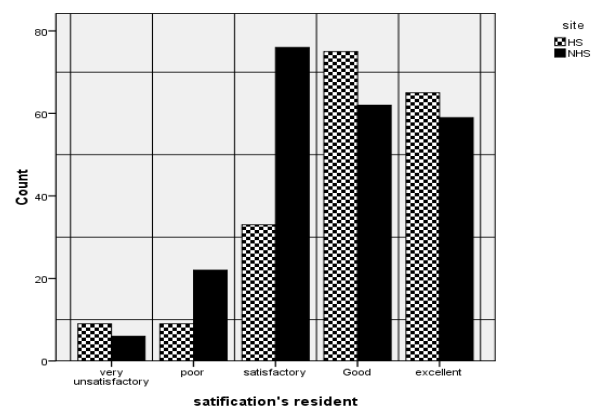

Fig. 3. Frequency of satisfactions of resident.

Table 7. Shows residents' satisfaction of tourism in local tourism

	$\overline{x}$	S.D.	Meaning	t	P
HS group	3.93	1.06	Good	2.72	0.01*
NHS group	3.65	1.05	Good		

*p-value < 0.05

4.4 Resident Wants More or Less Tourism Site in Future

Table 8 show residents' requirement on tourism attraction of tourism site between two groups is not difference and fail to support the hypothesis 4 (HS, mean=3.83; NHS, mean=3.60). The figure 4 show frequency of tourism site requirement found residents who live at HS want tourism site less than NHS resident.

Table 8. show resident s' requirement on tourism attraction of tourism site

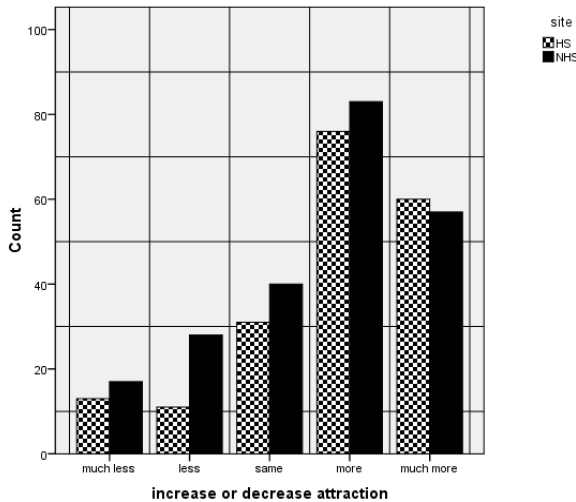|	$\bar{x}$	S.D.	Meaning	t	P
HS group	3.83	1.14	Good	2.01	0.05
NHS group	3.60	1.21	Good		

Fig. 4. Frequency of resident want tourism site.

The NHS residents perceive negative impact more than HS group but most respondents want more tourism attractions in the future because the residents are shown to be favorable toward growth but less favorable toward the tourism being near home which can create some problem such as traffic jam and litter [21]. The responses may have been influenced by the respondents' desire for economic benefits from tourism or better quality of life.

5. CONCLUSION

The aim of this paper was to assess residents' perception of environment impacts of tourism between two resident sites in Meuang District, Nan Province, Thailand. Residents' perceptions of negative environment impacts of tourism industry between two groups of residences are remarkably different. The respondents residing in non-tourism area perceive negative impacts more than respondents closely tourism area including noise pollution, congestion in town, overload of litter and traffic congestion. However, they have positive impacts from tourism and more support tourism development in the future. Tourism management should aim to reduce negative impacts of tourism. It is also necessary to demonstrate the importance of tourism on economic expansion in order to reduce poverty of residents, to supporting secondary jobs resident during low season, campaign for cyclists by bike lanes and car not allowed parking on bike lanes that help decreased traffic jam or air pollutions problem in tourism area, an increasing public transportation between tourism sites, a development solid waste system in tourism site by the trash can be seen easily and the waste is sorted out.

The limitation in this study is the inability to find the complete solid waste statistic data because solid waste management system consisting with sanitary landfill and improper landfill are not cover total solid waste generation (estimate 45% of total waste generation in Meuang District, Nan Province, Thailand). In 2017, Nan Province has started to change solid waste management system plan by close or restoration improper solid waste management system [22].

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