

# Environmental Management System for Tourist Accommodations in Amphawa, Samut Songkram, Thailand

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**Abstract**—Amphawa is the most popular weekend destination for both domestic and international tourists in Thailand. More than 112 homestays and resorts have been developed along the water resources. This research aims to initiate appropriate environmental management system for riverside tourist accommodations in Amphawa by investigating current environmental characteristics. Eighty-eight riverside tourist accommodations were surveyed from specific questionnaire, GPS data were also gathered for spatial analysis. The results revealed that the accommodations are well managed in regards to some environmental aspects. In order to reduce economic costs, energy efficiency equipment is utilized. A substantial number of tourist accommodations encouraged waste separation, followed by transfer to local administration organization. Grease traps also utilized in order to decrease chemical discharged, grease and oil from canteen and restaurants on natural environment. The most notable mitigation is to initiate environmental friendly cleansers for tourist accommodation along the riverside in tourism destinations.

**Keywords**—Environmental Management System, Tourist Accommodations, Amphawa, Samut Songkram

## I. INTRODUCTION

NATURE - based tourism is rapidly growing sector of the tourism industry since the concept of sustainable tourism has been identified by the Brundtland Commission. Consequently, it has been often proved to be powerful incentive for conservation in many parts of the world. However, in the same time, uncontrolled mass tourism has and continues to contribute to the degradation of many areas of natural and cultural significance, entailing the loss of biological and cultural diversity, as well as of important sources of income [1]. In Thailand, nature-based tourism and ecotourism also created both positive and negative impacts to the popular tourist destinations, including Amphawa.

Amphawa is located in Samut Songkram Province, Thailand, covering an area approximately 170 square kilometers, at a distance of 70 kilometers from Bangkok (Fig. 1).

Since 2000, Amphawa become the most popular weekend destination for both domestic and international tourists in Thailand. According to the various magnification factors, Amphawa has many attractive natural and cultural destinations. The major tourism activities are include agro tourism, firefly watching, appreciation way of life in floating markets and sightseeing along canals. The development of tourism in Amphawa is increasing rapidly while several environmental impacts have appeared. More than 112 homestays and resorts have been developed in Amphawa [2], especially along the riverside.

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The mass tourists at Amphawa floating market can generate income to local people however tons of waste and wastewater have been generated by tourists, respectively. Light from the expansion of the municipal area, resorts, and tourism activities also affect mating behavior of fireflies. In addition, water consumption of tourists during weekend also creates water shortage in Amphawa.



Fig. 1 Location of Amphawa, Samut Songkram

Moreover, the location of tourist's accommodation is situating nearby the riverside, which is very sensitive to discharge wastewater, waste, chemical pollutants to natural water resources may occur if there is a lack of appropriate environmental management system.

Therefore, this study aimed to initiate an environmental management system by integrated various environmental approaches for tourist accommodations in Amphawa which can be implemented in other tourist accommodations.

## II. METHODOLOGY

This research was conducted at riverside tourist accommodations in Amphawa District, Samut Songkram Province, Thailand from October 2010 – June 2011.

*The methodology was divided into 3 parts as follows:*

1. An Environmental management system questionnaire for tourist accommodation was developed. To develop the

guidelines for environmental management systems, questionnaires, books and research regarding homestays, resorts, ecolodges, Amphawa and sustainable tourism have reviewed. The questionnaire was composed of questions regarding environmental aspects which were included wastewater treatment systems, waste collection and separation, energy consumption, environmental education and interpretation, water and energy conservation, greenhouse gas emission and air pollution, and eco-friendly product consumption.

2. Eighty-eight riverside tourist accommodations were surveyed and investigated. In order to receive virtual situation for spatial analysis, the GPS data were also gathered.
3. Geographic Information System maps of environmental management system of tourist accommodation were analyzed. In addition, data were evaluated using ArcGIS version 9.3 software, Map Source Program, Topography Map (1:50,000), and Global Positioning System (GPS). Descriptive statistics were used to describe characteristics and environmental data of tourist accommodations. Spatial Data Analysis Technique was also appraised to indicate the distribution of tourist site accommodation in this research.

### III. RESULTS

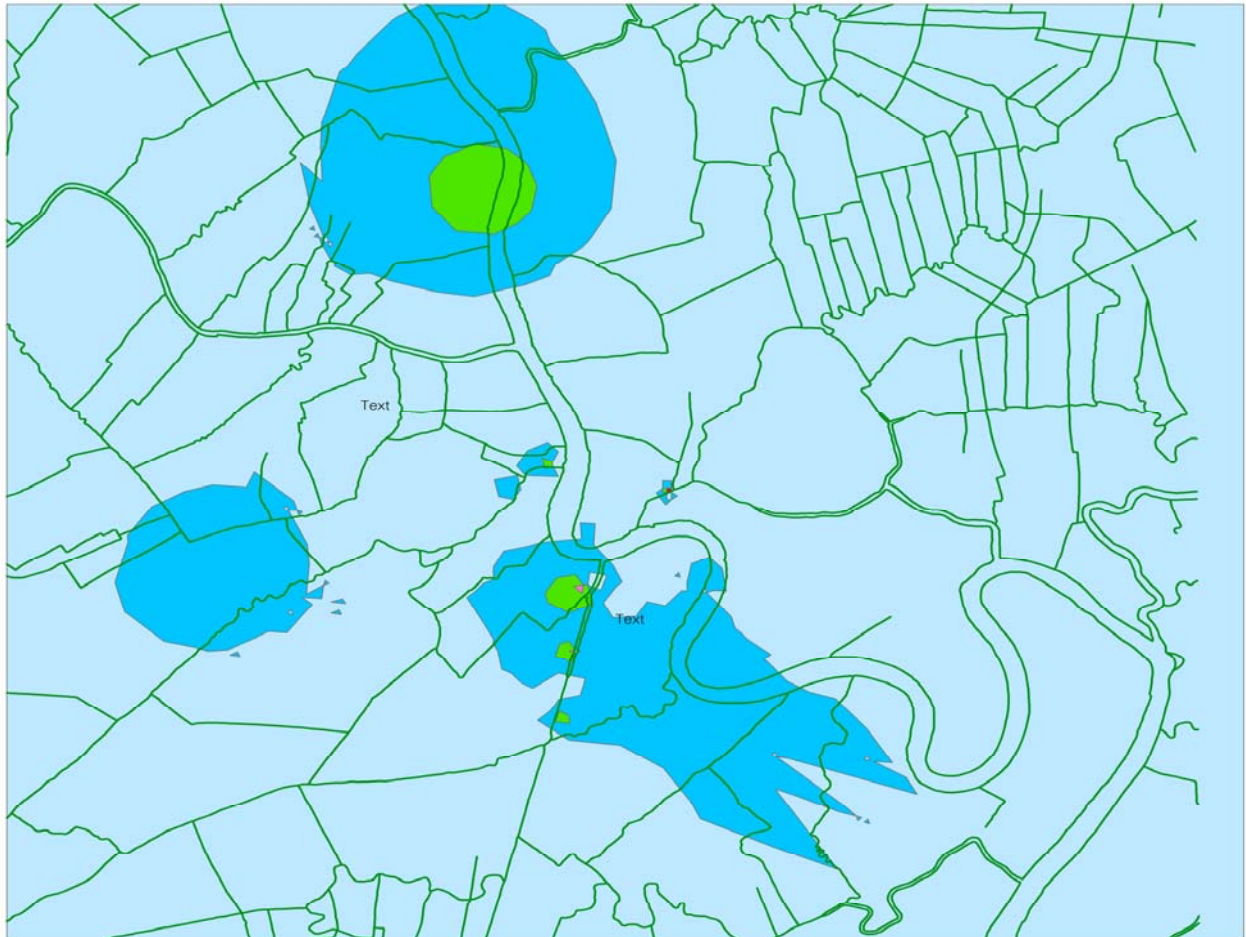
The results from a field study of 88 tourist accommodations in Amphawa revealed that the accommodations are well managed in regards to some environmental aspects.(Table I).

TABLE I  
 ENVIRONMENTAL ASPECTS OF TOURIST ACCOMMODATION IN AMPHAWA,  
 SAMUT SONGKRAM

<b>Environmental Aspects</b>	<b>%</b>
<b>Wastewater treatment</b>	
- Grease Trap	49.4
- Municipal pipe	5.5
- Directly Discharge	21.3
- Natural Treatment	22.5
- Others	12.3
<b>Waste Separation</b>	
- Yes	89.4
- No	10.6
<b>Waste Management</b>	
- Inland Landfill	1.1
- Open burning	3.4
- Composting	3.4
- Liquid Bio-composting	88.4
- Collecting to municipal treatment	29.2
- Selling to recycle process	
<b>Energy Efficiency Equipments</b>	
- Yes	96.5
- No	3.5
<b>Eco-friendly Cleansers</b>	
- Yes	51.3
- No	46.1
- Have been used	2.6
<b>Paddle Boat for Firefly Watching</b>	
- Yes	36
- No	64
<b>Environmental Education of Firefly</b>	
- Yes	77
- No	23
<b>Environmental Education of Sustainable Tourism for Tourists</b>	
- Yes	72.4
- No	27.6
<b>Preparation of Local Destination Guidebook for Tourist</b>	
- Yes	47.1
- No	52.9
<b>Water saving and Natural Resources Conservation Stickers</b>	
- Yes	32.6
- No	67.4



Water Consumption Demand of Tourist Accommodations in Amphawa,  
Samut Songkram, Thailand



0 0.2 0.4 0.8 1.2 1.6  
Kilometers

Range of Water Consumption Demand  
(Meters<sup>3</sup>/Month)



Fig. 2 Map of Water Consumption Demand of Tourist Accommodation in Amphawa

The results can be identified into following environmental aspects of tourist accommodation in Amphawa, Suan Luang, Plai Pong Pang, Kwaie Om, Tha Ka, Bang Chang and Muang Mai. Particularly, in order to reduce economic costs, 96.5 percent of tourist accommodations are utilized energy efficiency equipment (5 stars standard) such as air conditioners, refrigerators, and lamps.

Regarding to waste management, 89.4 percent encouraged waste separation in the accommodation, and 88.4 percent collected the household waste and sent to local administration organization.

Grease traps has been settled 49.1 percent in order to decrease the contamination of water resources by grease and oil from canteen and restaurants. However, the results revealed that at least 21.3 percent discharged wastewater directly to the water bodies.

Approximately 51.3 percent of tourist accommodations used eco-friendly cleansers such as dish washing cleanser from OTOP (One Tambon One Product) or green label products. 77 percent of tourist accommodations prepared firefly information and 72.4 provided sustainable tourism information for tourists. Only 32.6 percent of tourist accommodations have energy saving stickers.

In addition, water consumption demand for tourist accommodations in Amphawa has shown in Fig. 2.

The results shown that, tourist accommodations in Amphawa consumed water approximately 40,971 – 79,941 meter<sup>3</sup>/month, follow by 79,941 – 118, 910 meter<sup>3</sup>/month. The distributions of tourist accommodation are located in Amphawa and Suan Luang Sub-district, which are much situated closed to Mae Klong River and prominent canals.

The most fascinating mitigation is to initiate environmental friendly cleansers for tourist's accommodation along the riverside in Amphawa in order to decrease chemical discharge to the water resources. The results from the gathering data are various. There's some excellent examples of good practice but there are also some serious problems. So, the best practice or ideal Eco-resort can be developed by focusing on the following aspects [3], [4], [5] (Fig.3). Firstly, waste separation should be implemented as well as hazardous waste minimization.

Concerning wastewater management, grease traps and natural treatments should be applied. Reducing GHG emissions could be achieved by encouraging paddle boat trips rather than motorboat trips for firefly watching and will utilise renewable energy. Moreover, water supply is the major problem as during the high tourist season, many resorts are facing a water supply shortage. Therefore, a sanitary community tap water supply should be developed in prominent sub districts.

Last but not least, environmental education in terms of develop ecotourism guide books are also essence to raise tourist's environmental awareness.



Fig. 3 Best Practice of Environmental Management for Tourist Accommodation.

#### IV. CONCLUSION

Environmental management for tourist accommodation in Amphawa has been identified into several issues. The most important topic is related with water and wastewater management. During high tourist season, Amphawa has water shortage situation and the tap water supply from the local administration can't meet the standard. The provincial tap water is transfer from nearby province and has extra expensive cost. Therefore, water consumption demand also evaluated. Water management plan for Amphawa is recommended based on literature reviews and research including from Environmental Research Institute of Chulalongkorn University and Bumi Kita Foundation [6]. Before construction the canteen, or accommodation, the distance should faraway from water body according to this criteria:

- Keep the distance at least 3 meters (water resource wide less than 10 meters)
- Keep the distance at least 6 meters (water resources wide more than 10 meters)
- Keep the distance more than 12 meters (sea or lake at high level of water)

To summarise, an appropriate environmental management system for riverside tourist accommodation is needed and is necessary if the local environment is to be preserved.

#### ACKNOWLEDGMENT

This research was supported by Office of the Higher Education Commission, Thailand and Suan Sunandha Rajabhat University. Special thanks also extended to the homestays, resorts in Amphawa, and environmental science students of SSRU who helped and supported this project.

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