

# Synergistic Indicators for Sustainable Consumption and Production and Sustainable Tourism

Nuttapa Thanosawan  
*Development and Sustainability Program*  
 Chulalongkorn University  
 Bangkok, Thailand  
 sangchan.l@chula.ac.th

Sangchan Limjirakan  
*The Environmental Research Institute*  
 Chulalongkorn University  
 Bangkok, Thailand

**Abstract—** *Tourism contributes to national income. Meanwhile, it consumes resources causing waste and pollution affecting on human health, environment and socio-economics. Regarding to Goal 12 of Sustainable Development Goals, sustainable consumption and production (SCP) is promoted among global communities to reduce resource use, waste and pollution. Therefore, it is important to apply the SCP in tourism for sustainability. The World Tourism Organization (2014) stated that indicators are tools for measuring tourism impacts and these indicators should cover natural resource aspect. The research objective was to study synergistic indicators between the SCP and sustainable tourism (ST). The study areas were conducted in Bangkok and Pattaya, Thailand. Data were collected using a set of questionnaires for in-depth interviews of relevant stakeholders selected using a purposive sampling method. Data were analyzed by using statistical and descriptive analysis. The study found that indicators that would be synergized for the SCP and the ST include two significant indicator sets namely, resource efficiency and pollution control. Resource efficiency are the conservation and efficiency of energy and water uses. While pollution control are air pollution control, wastewater treatment and solid waste management. These indicators would lead to successful national policies implemented on the SCP and the ST.*

**Keywords:** *Synergistic Indicators, Sustainable Consumption and Production, Sustainable Tourism*

## I. INTRODUCTION

Tourism in Thailand provided 42.2 billion USD in 2017 and forecasted increasing to 79.4 billion USD in 2028, accounting between 9.4% and 12.8% of total Gross Domestic Product (GDP) in 2017 and 2028, respectively. Tourism also contributed to the total employment of about 15.5% in 2017 and projected increasing to 22.3% by 2028 [1]. In this regard, tourism activities have intensively consumed natural resources and affected on environment, ecosystems, socio-economics, human health and socio-culture. Such effects have to be clarified, monitored and evaluated for effective management [2]. The linkage between resource uses and socio-economic growth in tourism is unavoidable that would lead to unsustainable tourism [3]. As resource uses and management are important for socio-economic growth, Sustainable Development Goals (SDGs), Goal 12: Sustainable Consumption and Production (SCP) is promoted in global communities to decouple economic growth from resource uses, waste and pollution by enhancing sustainable resource management. The SCP is a broad concept that could be integrated in all economic sectors including tourism. Sustainable tourism in the context of the SCP is important to minimize negative impacts and prolong social benefits and socio-economic growth [4]. Tourism impacts would be

monitored using proper indicators on resource uses to ensure sustainable tourism [5]. The research is aimed to study synergistic indicators between the SCP and the ST for successful national policies implemented on the SCP and the ST.

## II. LITERATURE REVIEW

### A. Sustainable tourism (ST)

Sustainable tourism (ST) is tourism that focuses on its present and future impacts on economics, society and environment [6]. Sustainability should be emphasized in tourism because tourism puts pressure on the environment and resource uses, especially in the areas with fragile ecosystems and pollution and waste generated [7]. Tourism is regarded as a great resource consumer so it is crucial to ensure resource efficiency for supporting local well-being and local and global natural resources. Resource efficiency in tourism prevents its activities to over-consumption of scarce and nonrenewable resources. Furthermore, tourism should emphasize on reducing pollution and waste. Therefore, promoting resource efficiency along with pollution control requires the shifting consumption patterns of both tourists and businesses and should be embedded as core aspects of environmental management systems in businesses [6].

The ST indicators should respond to the main risks relating to tourism sustainability such as environment and natural resources and provide details for policy makers to understand the issues. Monitoring resource consumption, pollution and waste from tourism activities would benefit to tourism businesses, local communities and the environment. For example, reducing water consumption would potentially reduce business expenses, local inequity to water resources as well as minimizing environmental problems [5].

### B. Sustainable consumption and production (SCP)

Sustainable consumption and production (SCP) is one of the stand-alone goals of Sustainable Development Goals (SDGs) and a cross-cutting theme in other goals such as biodiversity protection [8]. It is a broad concept of promoting resource efficiency, sustainable infrastructure, provision of basic services and decent jobs while ensuring healthy society [9]. The SCP is divided into consumption and production. Sustainable production attempts to enhance production process to minimize resource use and waste [10]. Whereas sustainable consumption relates to lessen resource use and increase demands for low impact consumption [11].

One of the SCP's core principles is to decouple economic growth from environmental degradation requiring sustainable resource management for resource efficiency and waste management [9]. Resource efficiency can be achieved by maximizing resource productivity or minimizing resource use and can be applied at several levels such as companies or sectors [12].

The suggested indicators to reach the SCP should be monitored resource uses, amount of waste and greenhouse gas emissions through the production and consumption processes in order to evaluate the progress towards more sustainable consumption and production. Such indicators should also be monitored in several resources such as energy and water [13, 14].

### III. RESEARCH METHODOLOGY

#### A. Study areas

The study areas were conducted in Bangkok and Pattaya, Thailand to getting data relevant to the objective of the study.

Bangkok, the capital city of Thailand is one of the most attractive cities in the world with the increasing number of tourists from 37 million in 2013 to 45 million in 2017, making the national income increasing from 18 billion USD in 2013 to 28 billion USD in 2017. Whereas Pattaya is recognized as one of the famous tourist destinations in Thailand with the increasing numbers of tourists from 9.4 million in 2013 to 13.6 million in 2017, making the national income increasing from 3.2 billion USD in 2013 to 6.9 billion USD in 2017 [15-17].

#### B. Methodology

The quantitative and qualitative approaches were employed in this research. Purposive sampling method was applied to select the respondents. The total number of respondents were 39 which included national and local governmental agencies, private sector, academic institutes, state enterprise, non-governmental organization and non-profit organization, international agency and public organization. Data were collected by using a set of semi-structured questionnaires for in-depth interviews and were analyzed using statistical and descriptive analysis. The data analyzed were graphically presented in spider charts of percentage scoring.

### IV. RESULT AND DISCUSSIONS

The research results on sustainable tourism (ST) indicators compose of 7 sets namely, resource efficiency, pollution control, economics, transport infrastructure planning and control, destination planning and control, tourism operation and marketing and capacity building.

Indicators in resource efficiency can be identified into energy, land-use and biodiversity and water resource. For energy, 82.05% of respondents stated that policies and programs on energy conservation should be highlighted. While land-use and biodiversity, 82.05% of them pointed out the impacts from tourism activities should be monitored and focused on ecosystems protection. 74.35% of them stated that policies and programs on water conservations should be taken into actions.

The pollution control indicators include air pollution control, wastewater treatment and solid waste management. 71.79% of respondents viewed that air pollution standards would be important for the ST. 69.23% of them viewed that the effective treatment and management on wastewater would be reused and recycled, and 69.23% of them viewed that the amount of solid waste per capita would present trends in solid waste production which lead to better policy planning.

While in economics, 69.23% of respondents indicated that the GDP should be considered as an indicator for the ST.

In terms of transport infrastructure planning and control, 69.23% of respondents highlighted that the number of tourists using local public transportation would reflect to resource efficiency and pollution control.

For destination planning and control, 82.05% of respondents mentioned that the environmental and socio-cultural impact assessment should be an indicator for the ST.

For tourist operation and marketing, 74.35% of respondents emphasized that businesses with formal certifications such as the International Organization for Standardization (ISO) or national equivalents should be an indicator for tourism operation. 66.66% of them viewed that the indicator for tourism marketing should be the number of environmental friendly tourists to reflect the effectiveness of tourism marketing promotion.

Regarding to capacity building, 74.35% of respondents highlighted that education and training programs for the ST in local communities should be set up to raise their awareness.

Figure 1 presents the percentage of respondents on the ST indicators.

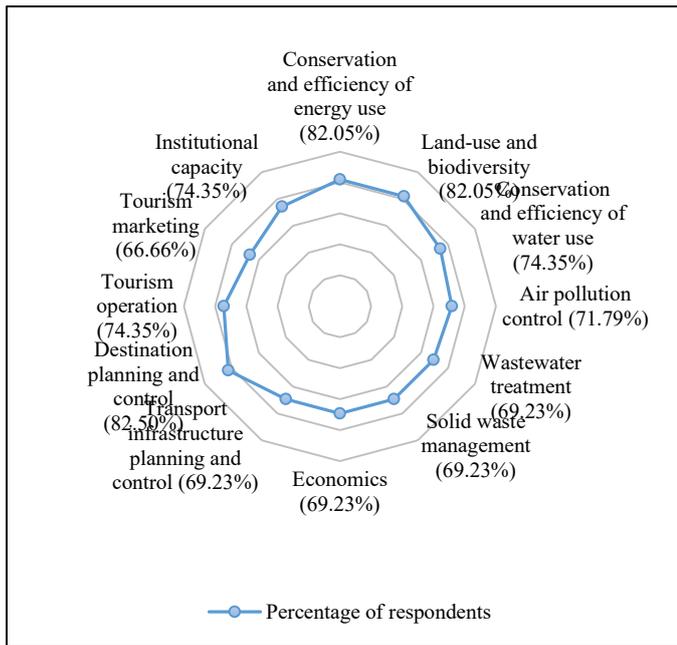


Figure 1. Percentage of respondents on the ST indicators.

Based on the United Nations Environment Programme, sustainable consumption and production (SCP) would enhance sustainable resource management, resource efficiency and pollution reduction [9]. While one of the ST principles comprises of resource efficiency and pollution control on tourism activities and development [12]. This can be performed as co-indicators to achieve the ST in the context of the SCP.

In this regard, the study found that indicators that would be synergized for the SCP and the ST include two significant indicator sets namely, resource efficiency and pollution control. The highest priority indicator in resource efficiency found was policies and programs on energy conservations presented by 82.05% of respondents, following by policies and programs on water conservations (74.35%). In terms of pollution control, the highest priority indicator responded was air pollution standards (71.79%) following by the percentage of reused and recycled wastewater (69.23%), and the amount of solid waste per capita accounting for 69.23% of respondents. The synergistic indicators for the SCP and the ST are shown in Table 1 and Figure 2.

Table 1. The synergistic indicators for the SCP and the ST.

Themes	Baseline issues	Baseline indicators	Percentage
Resource efficiency	Conservation and efficiency of energy use	Policies and programs on energy conservations	82.05%
	Conservation and efficiency of water use	Policies and programs on water conservation	74.35%
Pollution control	Air pollution control	Air pollution standards	71.79%
	Wastewater treatment	Percentage of reused and recycled wastewater	69.23%
	Solid waste management	Amount of solid waste per capita	69.23%

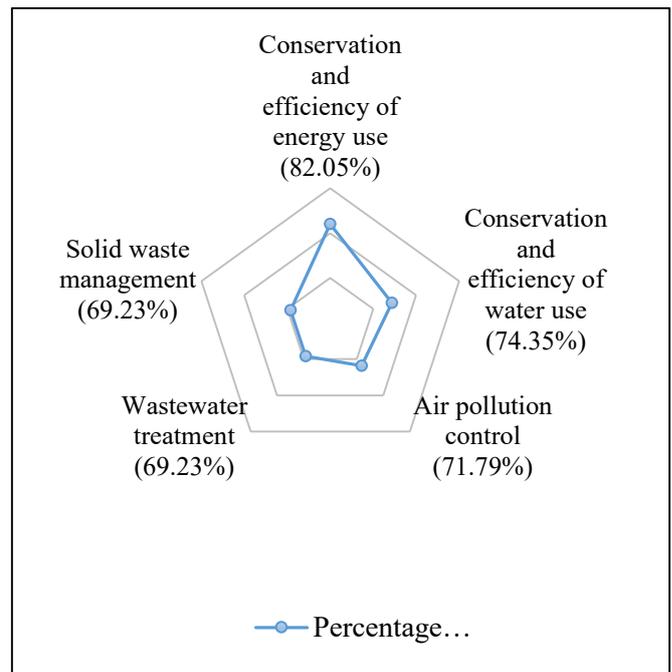


Figure 2. The synergistic indicators for the SCP and the ST.

## V. CONCLUSION

The synergistic indicators for sustainable consumption and production and sustainable tourism are sets of resource efficiency and pollution control. Resource efficiency indicators comprise of policies and programs on energy conservations and policies and programs on water conservations. Pollution control indicators include air pollution standards, the percentage of reused and recycled

wastewater and the amount of solid waste per capita. As tourism growth in Thailand has significantly contributed to national economic, the synergistic indicators for sustainable consumption and production (SCP) and sustainable tourism (ST) would lead to successful national policies implemented on the SCP and the ST.

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