RECREATIONAL VALUATION AND CARRYING CAPACITY: A CASE STUDY OF BANGSAEN BEACH, CHONBURI PROVINCE

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RECREATIONAL VALUATION AND CARRYING CAPACITY: A CASE STUDY OF BANGSAEN BEACH, CHONBURI PROVINCE

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ABSTRACT

This study aims to evaluate recreational use and physical carrying capacity, and to study tourists' behavior and various tourism factors associated with the use value of Bangsaen beach, Chonburi province. The primary data from the field survey and the secondary data that compiled from various other sources were used in this study. The study sample comprised of 400 Thai tourists randomly selected around the Bangsaen beach. Theoretical framework used in this study was of environmental economics, while the key analytical method were Zonal Travel Cost Method (ZTCM), Individual Travel Cost Method (ITCM) and the evaluation of Physical Carrying Capacity (PCC) using Crowding Perception.

The results revealed that the recreational use values of Bangsaen beach derived from ZTCM and ITCM were 2,604,804,320.83 baht/year and 3,710,903,067.44 baht/year respectively. The factors which affected the number of visits to Bangsaen beach were the travel cost and age of tourists. The travel cost had a negative effect on the number of visits. Age of tourists had a positive effect on the number of visits. All variables were evaluated at significant level 0.05.

The maximum PCC in the period of weekdays was 10,947 persons/day while the optimum PCC was 9,840 persons/day. During weekends, the maximum PCC was 14,176 persons/day and the optimum PCC was 13,468 persons/day. The average number of tourists visiting to Bangsaen beach on weekdays was 3,000 persons/day and 9,100 persons/day on weekends. It was found that number of tourists on weekdays and weekends still did not exceed the PCC.

Based on the tourism situation of Bangsaen beach today, it is not yet necessary to use a price mechanism to control the rise in the number of tourists because the beach can still accommodate tourists at a level not exceeding the PCC.

KEY WORDS: VALUATION/ USE VALUE/ PHYSICAL CARRYING CAPACITY/ TRAVEL COST METHOD/ BANGSAEN BEACH

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การประเมินมูลค่าและขีดความสามารถในการรองรับการท่องเที่ยว: กรณีศึกษา หาดบางแสน จังหวัดชลบุรี (RECREATIONAL VALUATION AND CARRYING CAPACITY: A CASE STUDY OF BANGSAEN BEACH, CHONBURI PROVINCE)

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บทคัดย่อ

การวิจัยครั้งนี้ มีวัตถุประสงค์เพื่อประเมินมูลค่าและขีดความสามารถในการรองรับการท่องเที่ยวและนันทนาการของหาดบางแสน จังหวัดชลบุรี รวมทั้งศึกษาพฤติกรรมของนักท่องเที่ยวและปัจจัยการท่องเที่ยวต่างๆ ที่มีความสัมพันธ์ต่อมูลค่าของหาดบางแสน จังหวัดชลบุรี ข้อมูลปฐมภูมิรวบรวมจากการสำรวจภาคสนามร่วมกับการใช้แบบสอบถาม โดยกลุ่มตัวอย่างที่ทำการศึกษา ได้แก่ นักท่องเที่ยวชาวไทย จำนวน 400 ตัวอย่าง ซึ่งทำการสุ่มจากนักท่องเที่ยวชาวไทยทั้งหมดบริเวณหาดบางแสน จังหวัดชลบุรี โดยกรอบทฤษฎีที่นำมาประยุกต์ใช้ ได้แก่ เทคนิคการประเมินมูลค่าสิ่งแวดล้อม ซึ่งประกอบด้วย Zonal Travel Cost Method (ZTCM) และ Individual Travel Cost Method (ITCM) และเทคนิคการประเมินขีดความสามารถในการรองรับการท่องเที่ยวและนันทนาการด้านกายภาพ ซึ่งได้แก่ การศึกษา Crowding Perception

ผลการศึกษา พบว่ามูลค่าการใช้ประโยชน์ด้านการท่องเที่ยวและนันทนาการของหาดบางแสน จังหวัดชลบุรี ที่ได้จากวิธี ZTCM และ ITCM มีมูลค่าแตกต่างกันมาก กล่าวคือ มีมูลค่าเท่ากับ 2,604,804,320.83 บาท/ปี และ 3,710,903,067.44 บาท/ปี ตามลำดับ ปัจจัยที่มีความสัมพันธ์กับจำนวนครั้งของการเดินทางไปหาดบางแสน จังหวัดชลบุรี ได้แก่ ต้นทุนการเดินทาง และ อายุของนักท่องเที่ยว โดยต้นทุนการเดินทางมีความสัมพันธ์เชิงผกผันกับจำนวนครั้งของการเดินทาง อย่างมีนัยสำคัญทางสถิติที่ระดับ 0.05 และอายุของนักท่องเที่ยวมีความสัมพันธ์ทางตรงกับจำนวนครั้งของการเดินทาง อย่างมีนัยสำคัญทางสถิติที่ระดับ 0.05

สำหรับการศึกษาเพื่อประเมินขีดความสามารถในการรองรับการท่องเที่ยว และนันทนาการทางด้านกายภาพ พบว่าช่วงวันธรรมดา สามารถรองรับนักท่องเที่ยวได้สูงสุด เท่ากับ 10,947 คน/วัน ในขณะที่จำนวนนักท่องเที่ยวที่เหมาะสม เท่ากับ 9,840 คน/วัน ช่วงวันหยุด สามารถรองรับนักท่องเที่ยวได้สูงสุด เท่ากับ 14,176 คน/วัน และจำนวนนักท่องเที่ยวที่เหมาะสม เท่ากับ 13,468 คน/วัน และเมื่อเปรียบเทียบกับจำนวนนักท่องเที่ยวปัจจุบัน ซึ่งในช่วงวันธรรมดาและวันหยุดมีนักท่องเที่ยวเฉลี่ย 3,000 คน/วัน และ 9,100 คน/วัน ตามลำดับ พบว่า ยังไม่เกินขีดความสามารถในการรองรับการท่องเที่ยวและนันทนาการทางด้านกายภาพทั้งในช่วงวันธรรมดาและวันหยุด ดังนั้น จากสถานการณ์การท่องเที่ยวของหาดบางแสน จังหวัดชลบุรี ในปัจจุบันยังไม่มีความจำเป็นในการใช้กลไกราคาเข้ามาควบคุมจำนวนนักท่องเที่ยว

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CHAPTER I
INTRODUCTION

1.1 Background Justification

At present, a stream of tourism is transformed from its former pattern. A conservative tourism or ecotourism is weighed the importance increasingly. It is partially due to generating of incentives by entrepreneurs in area of recreation or having a requirement in experience of recreation that has been changed. Another reason is due to a stream of awakening in area of conservation of natural resources and environment that increase the attraction to natural area and drives activities concerning recreation and tourism to weigh more the importance to the impact to occur on natural area and environment complementing with weighing the importance at present by national policy to development of tourism sources to be consistent with ecological conservation (FRC, 1997). Therefore, development of tourism sources must be weighed to overall potential of the areas to establish suitable activities and development level that will be helpful in maintaining the quality of tourism sources coupled with maintaining of recreational experience with quality by tourists.

Bangsaen beach is a beautiful tourist spot and famous among tourists for long time and located 13 kilometers far from Chonburi city. Beach area is about 2.5 kilometers long and 50-200 meter wide. It consists of full facilities as accommodation, bungalow, fresh water bathroom, seafood restaurants and water sport equipment. Number of tourist visited Bangsaen beach in 2004 was 1,168,082 persons and by the estimation of Chula Unisearch , Chulalongkorn University, number of tourist in 2011 will be 3,208,013 persons respectively (TAT, 1995).

With the tendency of an increasing number of tourists consecutively, it can be predicted that revenues deriving from tourism industry in the area will be increased making every party concerned ain to lay out plans to develop tourism industry by

developing infrastructural and utility systems such as modifying and cutting new routes of road and addition of laying electrical and tap water systems and so on. In this regard, the purpose is to let tourists able to access Bangsaen beach more convenient together with getting comfort upon arriving Bangsaen beach, Chonburi province to such an extent that it makes objectives or ways in management inconsistent with development to serve as a source of conservation tourism which is a sustainable tourism development.

However, in case tourism development plans both in part of national plan and local plan for development of Bangsaen beach, Chonburi province are considered, it was found that in the case of having a development of an index indicating area of environment that regarded natural resources and environment as a factor in development plan of economic system in the area, it would be helpful to create sustainable tourism development consequently.

Environmental valuation is one of indexes in area of environment and is an important economical instrument that has been brought to use in the management of natural resources to be consistent with ways of conservation. And as a major benefit of natural tourism sources tends to be non-market goods and services since these goods feature as public goods, namely, they are products being able to consume collectively and unable to prevent from consumption by other people, this causes to occur a failure of markets. Therefore, studying of cost and value of Bangsaen beach in term of money out come is vital to planning of resource allocate to accommodate a tendency of an increase of tourists in the future.

When there is a plan laying for tourism development by bringing value of tourism sources to be considered as a capital, the consequence is how to develop to be compatible with the capacity that tourism sources are able to accommodate. Therefore one of another indexes that is concerned with management is recreational carrying capacity (RCC) which, means determining quality of tourists and scope of development to be suitable and to have a balance that do not create damage to environmental and ecological systems in such tourism areas and do not have an impact

on people's feeling and thought in local areas (O'Reilly, 1986) since tourists who come to relax and perform recreational activities on Bangsaen beach have a tendency to increase every year. Development occurred to accommodate a large quantity of tourists can happen. But sustainable and efficient development is essential to be knowledgeable about carrying capacity of those resources firstly because if there is a development in excess of its carrying capacity it can cause occur deterioration consequently.

The above mentioned problems need to be solved by involving all organizations. The approach requires the correct and clear information. Therefore determining their value and carrying capacity are an essential factor for their sensible use and management. This study applies economic and social science approach in the recreational valuation and carrying capacity of Bangsaen beach in forms of money and suitable number of visitor in the study area. The result of this study will be used as information to establish the strategy of sustainable beach usage.

1.2 Objectives

1.2.1 To evaluate the recreational use value of Bangsaen beach, Choburi province as monetary price value by using Travel Cost Method, (TCM).

1.2.2 To study tourist's behaviors and various tourism factors associated with use value of Bangsaen beach, Chonburi province.

1.2.3 To study and evaluate the physical carrying capacity of Bangsaen beach, Chonburi province.

1.3 Conceptual Framework

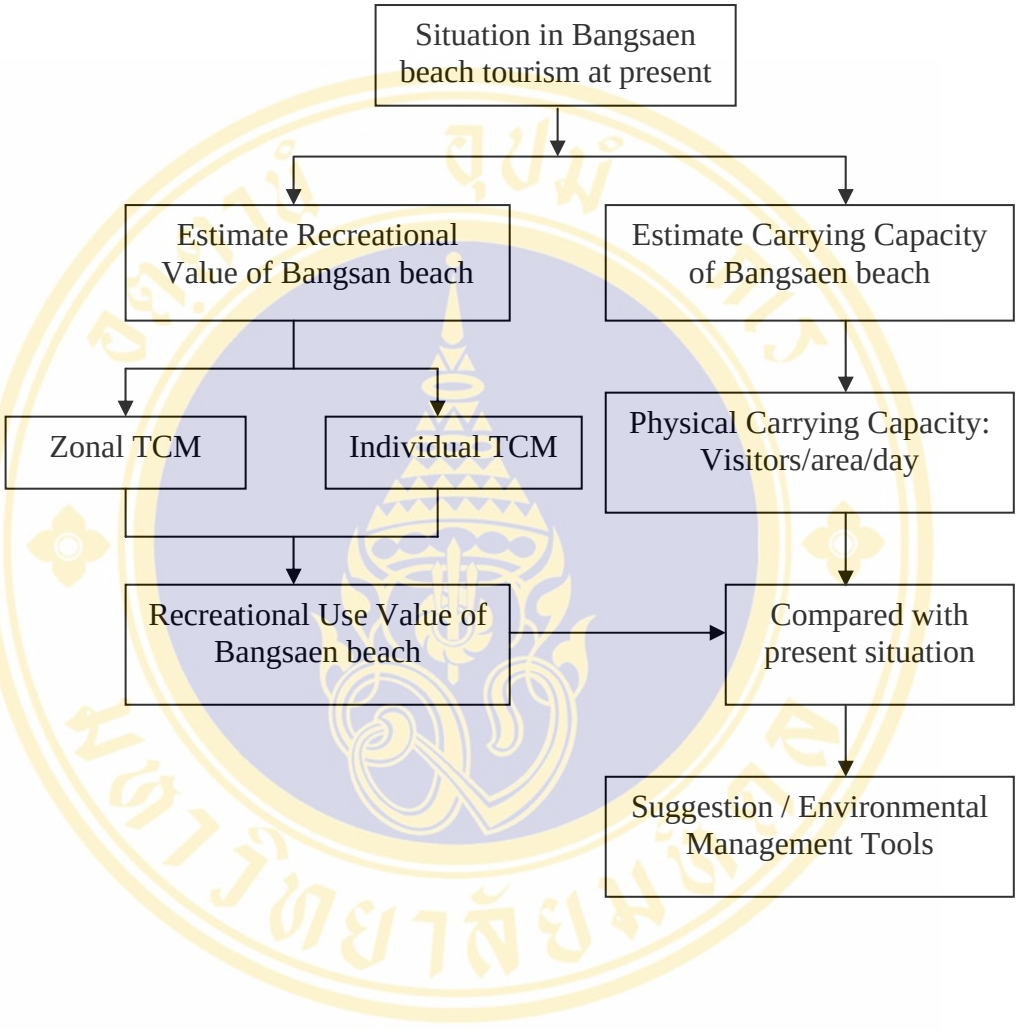


Figure 1-1 Conceptual framework

1.4 Scope of Study

1.4.1 Bangsaen beach, Saensuk sub-district, Muang district, Chonburi province (about 2.5 kilometers long and 50-200 meters wide) was used as a study area.

1.4.2 Two environmental economic approaches were used to evaluate the values of Bangsaen beach. The first method was Zonal Travel Cost Method and the second method was Individual Travel Cost Method. The results from these two methods will be used to calculate the recreational use value of Bangsaen beach.

1.4.3 Evaluation of recreational carrying capacity of Bangsaen beach in this study focused on only Physical Carrying Capacity (PCC).

1.4.4 Four hundred Thai tourists were used to be the population samples as respondents randomly selected surrounding the Bangsaen beach, Chonburi province.

1.5 Variables of Study

The variables of the study were divided into independent variables and dependent variables as follow;

1.5.1 Independent variables consist of socioeconomic characteristics of the visitors such as age, sex, education, monthly income and tourism behavior of the visitors such as hour usage for recreation.

1.5.2 Dependent variables were use value of Bangsaen beach with the TCM and Physical Carrying Capacity (PCC) of Bangsaen beach.

1.6 Hypothesis of Study

Quantity and characteristic of recreational use were affected the physical carrying capacity of Bangsaen beach, Chonburi province.

1.7 Definition Terms

1.7.1 Economic valuation as the techniques are base largely on consumer or producer willingness to pay for an improvement (or willingness to accept compensation for a deterioration) in natural systems and ambient environmental quality (Freeman, 1979).

1.7.2 Use value as the value derived from the actual use of a good or service, such as hunting, fishing, bird-watching, or hiking. Use values may also include indirect uses. For example, an Alaskan wilderness area provides direct use values to the people who visit the area. Other people might enjoy watching a television show about the area and its wildlife, thus receiving indirect use values. People may also receive indirect use values from an input that helps to produce something else that people use directly. For example, the lower organisms on the aquatic food chain provide indirect use values to recreational anglers who catch the fish that eat them (Dennis and Marisa, 2002).

1.7.3 Travel Cost Method as a means of determining value figures for things which are generally not brought and sold, and therefore fall outside of the market's pricing system. The non-market assets which it is most often applied to are "recreational resources" which necessitate significant expenditure for their enjoyment (Hanley et al, 1995).

1.7.4 Physical Carrying Capacity as the impact of available space on recreation, such as number of people per squared foot of flat sleeping areas, number of people per acre or square mile, camping parties per beach, or number of people in critical areas (Shelby and Heberlein, 1986).

1.8 Abbreviations

This study has fixed abbreviation for the study as;

TCM is Travel Cost Method
ZTCM is Zonal Travel Cost Method
ITCM is Individual Travel Cost Method
RCC is Recreational Carrying Capacity
PCC is Physical Carrying Capacity

1.9 Expected Results

To provide the information to the government for better decision making process regarding policy and plan for beach management in Bangsaen beach, Chonburi province.

CHAPTER II
LITERATURE REVIEW

2.1 General Condition of Saensuk Municipality Area

2.1.1 Location and Administration Boundary

Saensuk Municipality is located in Muang district, Chonburi province. It is 74 kilometers far from Bangkok and has covered area for 3 sub-districts, they are whole Saensuk sub-district (15 villages), some parts of Muang sub-district (Moo 1 to 4), and some part of Huaykapi sub-district (Moo 5) with total area of 20,268 square kilometers.

2.1.2 Territory

In the year 1988, Royal Decree has established Saensuk municipality, Muang District, Chonburi province and limited the area of Saensuk municipality as follows.

Northern side: starting from the 1st boundary pillar which is located at the end of Sammuk cape and following the coast of Thai Gulf in the east until 2nd boundary pillar which is located at the mouth of Klong Bangprong on eastern side which connects with Thai Gulf.

From the second boundary pillar, following the bank of Klong Bangprong on eastern side to southeast and crossed the state highway number 3 Bangkok-Trad (Sukhumvit Road) until 3rd boundary pillar which is located on the northern side of Klong Bangprong at the point where it needs the demarcation line of Sammuk and Muang sub-district.

Eastern side: starting from the 3rd boundary pillar. Following the demarcation line of Saensuk and Muang sub-district to south until 4th boundary pillar which is located at the side of provincial highway number 3144 which is separated from highway number 3 (Seansuk) – Khao Keao National Park, southern part at the point where it meets the demarcation line of Saensuk and Muang sub-district.

From the 4th boundary pillar, following the provincial highway number 3144 to the west until 5th boundary pillar which is located at the side of provincial highway number 3144 the distance from the center of separate road to state highway number 3 Bangkok-Trad (Sukhumvit Rd.) to the east is about 1,000 meters.

From the 5th boundary pillar is goes to southern part until 6th boundary pillar which is located about 1,000 meters distance from the center of state highway number 3 Bangkok-Trad (Sukhumvit Rd.) which interest the northeast side edge of Klong Nam Min to the east.

Southern side: starting from the 6th boundary pillar it goes to southeast until 7th boundary pillar which is located at the middle of Klong Saphan, the distance from the center of state highway number 3 Bangkok-Trad (Sukhumvit Rd.) to the east is about 1,000 meters.

Table 2-1 Represent tourist spots in Chonburi province

Natural Type	Historical and Ancient Type	Activity and Cultural Type
1. Cho Mafueng Waterfall	1. Si Pa Ko City	1. Angsila
2. Bangsaen Beach	2. Pa Ya Rae City	2. Marine Science Institution
3. Kao Sammuk	3. Pra Rot City	3. Jittapawan College
4. Ko Sichang	4. Intaram Temple	4. Nongnooch Park
5. Khang Kwan Island	5. Si Hing Buddha Tower	5. Chang Pattaya Village
6. Ko Lann	6. Bot Temple	6. Bang Pra Golf Club
7. Ko Sak	7. Luang Prom Wad Temple	7. Si Racha Market
8. Ko Chin	8. Replica City	8. Nong Mon Market
9. Ko Pai		9. Wickerwork Village
10. Jomtien Beach		10. Ko Loi
11. Rom Sai Thong Waterfall		11. Jirarose Farm
12. Viang Wang Cave		
13. Chang Nam Gulf		
14. Kao Chom Poo Waterfall		
15. Morn Namg Sib Song		
16. Kao Kaew Opened Zoo		
17. Udom Gulf		
18. Laem Chabang		
19. Ko Samae San		
20. Ko Juang		
21. Ko Puk Cha Wan		
22. Bang Sa Rae		
23. Kret Kaew Bech		
24. Ka Reang Cave		
25. Bang Pra Reservior		
26. Chan Ta Tern Waterfall		
27. Pattaya		
28. Ang Dong Tan		
29. Kao La Ang		
30. Suan Sear Si Racha		
31. Million Years Stone Park & Crocodile Farm		

Source: TAT (1997)

From the 7th boundary pillar, following the Klong Saphan to the west and crossed the state highway number 3 Bangkok-Trad (Sukhumvit Rd.) until 8th boundary pillar which is located at the middle of the mouth of Klong Saphan which connects with Thai Gulf.

Western side: starting from the 8th boundary pillar, following the coast of Thai Gulf to the northwest until 9th boundary pillar which is located at the end of Tan cape.

From the 9th boundary pillar, following the coast of Thai Gulf to the east and north until it connected to the 1st boundary pillar. Seansuk municipality has boundaries as follows:

Northern side : adjoining Ban Puk and Samsuk sub-district, Muang Chonburi district
Eastern side : adjoining Huay Kapi sub-district, Muang Chonburi district
Southern side : adjoining Bang Phra sub-district, Si Racha district
Western side : adjoining Thai Gulf

2.1.3 Topography

Topography of Seansuk municipality is slope from the east which is about 3 meters high in average above sea level, down to the west and the north of seashore. Average slope is between 0.30-0.75%. Northern area of municipality is lowland, which is about 75 meters high in average sea level.

Seashore of Seansuk municipality can be divided into 3 parts as Pakklong Bangpong Gulf, Kaosammuk Gulf and Bangsean-Wonnapa beach by having Kaosammuk cape separates between Pakklong Bangpong Gulf and Kaosammuk Gulf. Laem Tan separates between Sammuk Gulf and Bang Sean-Wonnapa beach.

Pakklong Bangpong Gulf is mud mixed sand because soil sediment flows from Watbangpeng stream. The depth of the sea is 2 meters, usually appears 1-2 kilometers from the shore. Most of the seashore areas used for seashore breeding sources.

Bangsean-Wonnapa beach is a long beach from Laem Tan to the end of Saensuk municipality. The depth of the sea is 2 meters, usually appears 600 meters to 2 kilometers from the seashore. Bangsean as a public beach is only 2.5 kilometers long after beach that is owned by private. There is no public entrance until the end of Saensuk municipality.

2.1.4 Climate

The weather of Saensuk municipality area is tropical rainy type or tropical field type. In the southwest monsoon season, the weather is wet and rainy for the whole season but it will dry in winter.

2.1.4.1 Temperature

Saensuk municipality area has the highest and lowest temperature of 32.5-26.5 ^{o}C. Average temperature in each month is as follows:

Table 2-2 Represent average temperature divided by season in Saensuk municipality area

Month	Temperature (^{o}C)
March – June	31.3
July – October	29.5
November – February	27.5

Source: Saensuk municipality (1996)

Comparing the temperature with the comfort zone level which is between 22-27^{o}C. Only November to February is comfort. Other months are rather hot.

2.1.4.2 Humidity

Average humidity at Saensuk municipality area is between 68.1%-82.5%. Only May to November which is rainy season for 7 months, the humidity is higher than 75%.

2.1.4.3 Rain Volume

Average rain volume of Saensuk municipality is 1,267.50 mm per year which is in the medium range. Average rain volume in each month is as follows:

Table 2-3 Represent average rain volume divided by season in Saensuk municipality area

Month	Rain Volume (mm./year)
March – June	11
July – October	10
November - February	9

Source: Saensuk municipality (1996)

Rainy season in Saensuk municipality area will start in June and finish in October. Comparing water evaporation with rain volume found out that water shortage will be in December to April.

2.1.4.4 Wind

Main wind direction is from the south for 8 months from February to September. Average wind speed is between 5.9-7.8 knots. The highest windy speed recorded was 68 knots.

2.1.5 Natural Resource

2.1.5.1 Soil

Suitable of the soil for agriculture in Saensuk municipality can divided into 3 groups as follow in details

- Suitable area for rice farming

Spreading into 3 areas as northern side of provincial highway number 31337 and southern side of municipality. These are the most suitable areas for rice farming which irrigation system can be arranged for maximizing the land usage and whole year population. Presently, most area is rice farming.

- Suitable area for developing

Spreading in long shape from the east of state highway number 3 (Sukhumvit Rd.). From the north to the south of municipality area is suitable for rice farming but there is a problem about the surface of the land which is sand soil and low quality. Most area is rice farming.

- Suitable area for developing to become animal breeding field

They are seashore sand ridge area and remaining area which does not suitable for agriculture but can develop to be permanent breeding field. Presently, they are tourist spots, community and fruit parks.

2.1.5.2 Natural Water Sources

Natural water sources in municipality is rain, port water and underground water

- Rain water

Due to no domestic weather examination station in municipality, weather statistic of Chonburi province for rain volume measurement will be used instead. Saensuk municipality received rain volume for 1,267.50 millimeters per year. Rainy season starts from June to October. Other months have only little rain.

- Port water

Bangpreng canal is the only one port water which has water in rainy season.

- Underground water

In the area there are 5 underground water sources as Taipipat Ice Factorypond, Korboran Temple pond and pond in Burapa University. Total area for storing is about 550,450 and 750 cubic meters. From the study by the Department of Underground Resources found out that underground water source received from the layer untightened material such as clay soil, pebble and sand of new sediment ground level area and low absorption flooded level area. Density of underground water level is

lower than 12.00 meters. Substitute water volume is between 2.5-7 cubic meters per hour. More than 60% of ponds give good quality water. The remaining gives low quality water because of iron and chloride mixed.

- Sea water quality

From the survey and sea water quality analysis report of eastern seashore in 1995 by Pollution Control Department found out that Bangsean beach area has sea water quality in satisfactory level and better than 1994. bacteria volume in colifrom group is low within the standard criteria as below 1,000 units. The lowest measurement found is 2 and the highest is 540 units (standard for swimming is less than 1,000 units).

From the TAT (1997) study report of surrounding condition in Saensuk municipality and connected area assumed that the origin of dirtiness in sea water around Bansean beach mostly comes from residents, shops and hotels. Community and others located along seashore including industrial factory both in Chonburi and Chachoengsao province around Bangprakong River. Besides, the effects of southwest monsoon also cause anti-clockwise circulation of sea water in Thai Gulf which brings along with the dirtiness from Bangprakong River to Bangsean beach. Not only those, but in the early of July 1996 there was water color changing or red tide phenomenon at Bangsean beach area.

2.1.6 Population

Saensuk municipality has actual population at the end of 2005 is 193,736 persons, divided into 93,190 males and 99,826 females which can be divided by age as showed in Table 2.4.

There are 14,360 families by average 5 persons per family. Average in and out population is 1,044 and 1,945 persons per year. Birth and death rate is 410 and 120 persons per year respectively and there are 24,170 persons who have right to vote. Average income of population is about 208,925 Baht/person/year.

Average density of population in municipality is 1,703 persons per square kilometers. Most of the population stay in seashore area from Pakklongbangprong to Wonnapa beach and along important transportation route as state highway number 3 (Sukhumvit Rd.), Nongmon market area and provincial highway number 3137 which separated from state highway number 3 to Bangsaen beach.

Table 2-4 Represent population divided by male-female in Saensuk municipality area in 2005

Age Range (Year)	Sex	
	Male	**Female**
0-5	1,444	1,540
6-10	3,593	2,296
11-20	2,504	2,534
21-30	2,427	2,630
31-40	2,585	2,621
41-50	1,317	1,894
51-60	1,068	1,117
60 up	1,067	1,041
Total	**16,005**	**15,673**

Source: DOPA (2005)

Population of municipality changes 1.72% per year comparing with the status as sanitary between 1983 to1993. Estimation on average growth rate of population in the future is 2.84% per year. Therefore the population in 2011 will be about 54,364 persons (TAT, 1997).

Table 2-5 Represent forecast of population in Saensuk municipality between 2006-2011.

Year	2006	2011
Population (Person)	47,262	54,364

Source: TAT (1997)

2.1.7 Social Condition

2.1.7.1 Nationality, Religion, Tradition and Culture

Most of populations in Saensuk municipality are Thai and Buddhists. There are 6 Buddhist temples, 2 monasteries and 1 Christian church. Buddhist, Christian and Islam are 95%, 3% and 2% respectively. Therefore most tradition and culture are related to nationality and believe in religion. Classification on local tradition can be show as Table 2.6.

2.1.7.2 Community

There is one crowded community in Saensuk municipality is Soi Chokdee village community which has 165 residents with 660 persons in total. There are 286 males and 374 females. The community has electricity and water supply. It also has 7 sub-communities as Chokdee village community, Muang village community, Laemtan-Kaosammuk community, Donbon community and Sattwon community. Number of population under 20 years old is 7,666 persons. There are 2 community committees and 80 persons of public health volunteers in Muang area. Main career of population in each community is trading and fishing. Average income is about 3,500 Baht/month.

Table 2-6 Represent the classification of local tradition in Saensuk municipality

Tradition	Activity	Period of celebration
1. Kor Phra Sai Wan Lai	Donation, Pouring water on the hand of superior, Building sand chedi	April
2. Loy Kratong	Loy Krathong at Bangsaen beach area	November
3. Candle Celebration	Candle procession at temple	October
4. Tod Kra Tin	Offering robe to monks at the end of Buddhist lent	October
5. New Year	Mass offering to monks with rice and dry food stuffs	January

Source: TAT (1997)

2.1.7.3 Education

Government and private education institute in Saensuk municipality are as follows:

Kindergarten Level

1. School under National Primary Education Office 6 schools
2. School under Private Education Office 5 schools

Primary Level

1. School under National Primary Education Office 6 schools
2. School under Private Education Office 5 schools

Secondary Level

1. School under National Primary Education Office 1 school
2. School under Private Education Office 1 school
3. School under Ordinary Education Department 3 schools

Higher Education Level

1. Government University (Burapha University) 1 place
2. Tourism and Hotel Training Institute Under Tourism Authority of Thailand 1 place

Public health service unit in Saensuk municipality area are as follows:

1. Burapha University Hospital	1	place
2. Sub-district Health Station	2	places
3. Public Health Service Center of municipality	1	place
4. Private Clinic	12	places

2.1.8 Economic Condition

Saensuk municipality has an ability to become recreation and tourist center in servicing lodging place, activities in tourism and consumer products selling. Besides from ability in tourism and commercial, municipality also has another important ability as the location of Burapha University and Marine Science Institute. Economic condition in Saensuk municipality is as follows:

2.1.8.1 Commerce

Commercial area of municipality locates on Bangsaen beach area, along roadside of state highway number 3 (Sukhumvit Rd.) and Nongmon area. There are 1,819 commercial operators in municipality which consist of 5 petrol stations, 1 shopping plaza, 1 slaughter house including 645 general shops which can be divided into 182 general shops, 284 food shops, 27 clothing shops, 99 beauty parlors, 45 hardware and machinery shops, 170 shops selling particular goods, 2 private fresh market and 1 Sunday market. Beside, there are about 1,048 stall operators. For financial institute, there are 11 banks in the area.

2.1.8.2 Industry

Municipality area has 38 industrial factories by dividing into 2 large industrial factories, 1 medium industrial factory and 35 small industrial factories which located in all area such as 25 machinery factories. Other factories are rice mill and saw mill. Besides there are factories which supply equipment in production and consumption of the community e.g. ice factory, slaughter house and etc.

2.1.8.3 Services

Tourism industry and related activities of Saensuk municipality expands rapidly because of the landscape and beautiful natural scenario, seaside connected area are not far from Bangkok, and convenient in transportation. Accommodation in the area consists of 7 hotels with 541 rooms in total. If including bungalows and guest houses, it will be 13 places with 870 rooms in total with 3 night clubs. By this supporting factor, there are a lot of Thai tourists from various province visit the area in each year which is important economic activities and makes good revenue to the community.

2.1.9 Infrastructure

2.1.9.1 Communication and Transportation System

City Plan Office has separated the road system of according to the usage and road size to prevent unnecessary traffic congestion and separate the downtown traffic and intercity traffic which consist of 4 road types as

- Major road is important road of traffic system in municipality. It will serve incoming or outgoing and passing through type which is high speed and need proper control in connecting. The size of this road type is 30 meters up as state highway number 3 (Sukhumvit Rd.).

- Main road will receive the cars from major road and distribute to secondary road. It also has passing through traffic type. It connects various parts of the city. The size of road starts from 20 meters as provincial highway number 3134 and 3137.

- Secondary road will receive the cars from main road and distribute to sub road. It serves specific land usage in each type and connected to each community. The road size starts from 14 meters.

- Sub road is an existing road which does not set in communication and transportation project plan or may be the new road for handling traffic volume from secondary road to residential in the municipality. The size of the road must big enough for protection fire extinguishing and relieving public danger.

2.1.9.2 Public Utilities System

- Water supply

Saensuk municipality has water supply from Bangsaen which is under the operation of Chonburi region water supply. The froduction is depend on raw water from bang Phra water reservoir by Bang Phra 1 and 2 water filter station with 62,4000 cubic meters per day distribute to Chonburi inhabitants which Nong Khor water reservoir was reserved for water production in 1996 and can supply the water for 23,000 houses.

From forecasting, the population within Saensuk municipality in 2011 year will be about 54,364 people. If estimate to supply the water for everyone the present will be 250 liters per person which shows that in the future it needs about 13,591 cubic meters of water supply per day.

For tourist in the same year, who pass by will need 80 liters per person per day and who spent the night will need 200 liters per person per day. The quantity of tourists comes on weekends and festivals is about 13,417 people, which one-day trip and spent the night tourist need water supply 1,754 and 2,298 cubic meters per day respectively. Total water supply needed in the area is 17,643 cubic meters.

Table 2-7 Represent estimation on water supply demand in Saensuk municipality between 2006-2011.

User Type	Year : Water Supply Volume (cubic meter/ day)	
	2006	**2011**
1. Population in municipality	11,816	13,591
2. One-day Tourist	1,637	1,754
3. Overnight Tourist	2,144	2,298
Total	**15,597**	**17,643**

Source: TAT (1997)

From forecasting the water usage until 2011 year found out that the water volume which product at present is seem to be enough to supply for people and tourist in Bangsaen beach area for another 15 years because water usage in the future will be 1:3 ratio of present water productivity. In the same time at that period the responsible unit which is Chonburi water supply has to find the raw water reserve source to supply enough water for the demand. After 15 years, there will be a standard to manage the use of water to use the natural resources for long time and highest usage.

- Electricity

Chonburi province depend electricity on Bangprakong Electricity Station of Electricity Generation Authority of Thailand to use within the province. There is a sub-station in the area such as Bangsaen Regional Electricity Station which can supply covering the area of Saensuk municipality, Angsila sub-district, Huaykapi sub-district and Muang sub-district. Saensuk municipality has got the electricity service about 98% in average, with one category is residents which is 25,341 persons and use electricity 14,079,578.37 units per month and the other is various public services which is 76 cases and use electricity 105,213 units per month.

From the TAT (1997)'s report of the study by interview with the manager and operation staffs of the mentioned unit found out that the electricity supply in Bangsaen beach area is quiet enough for users at present and many places are using electricity. The unit assigned to build a sub station by itself. Therefore electricity usage in Bangsaen area for various activities will not have obstacles and limitation to the investment both in present and future.

- Drainage system

Saensuk municipality has flooded area for 0.2% of total area which always happens between October to November by average maximum flood period for 30 days. It was effect public health and public property. Problem solving operation of the municipality is construction of water draining pipe for 42.83 kilometers distance and has 7 water pumps with 10 staffs per day which are adequate for problem solving in the present situation.

- Wastewater treatment

Waste water treatment station of Saensuk municipality has Public Works Department which is the unit for construction with 800 million Baht amount, by oxidation ditch type in activated sludge treatment system characteristic. It consists of oval shaped track with 2.5 meters deep and installs air filter machine in jet aerator type for filling air to the waste water. As biological oxygen demand of the water is 20 milligrams per liter including making the water circulation in circulated canal between 0.3-0.6 meters per second. Waste water from circulated canal will flow to chlorine filling tank for disinfecting unit and released to the sea. Sediment from the lower part will be return sludge. Remaining will be sent to eliminate in sludge dowering system. The municipality does not collect any charge or have revenue from the treatment.

- Wastewater volume

The estimation in 2011 found out that population in Saensuk municipality will produce waste water for 300 liters per person. Therefore there is waste water for treatment about 16,309 cubic meters per day from the total population of 54,364 persons. Waste water volume from tourists in the same year from the same year from the estimation in the weekend period is about 33,417 persons per day by separating into one-day trip and overnight type which estimated to produce waste water about 64 and 200 liters per person per day respectively. Therefore it will have waste water from one-day trip tourist for 1,403 cubic meters per day and overnight tourist for 2,298 cubic meters per day. Total waste water in every type for treatment is about 20,010 cubic meters per day.

From the estimation of waste water and consideration the comparison with the ability of waste water treatment of municipality found out that the system has the ability in suitable level with waste water volume only at present. Therefore in long term, it is necessary for municipality to find area together with treatment system development to have ability in treating more waste water by Public Work Department as supporting unit in studying the appropriate of the system and construction budget.

Table 2-8 Represent estimation on waste water in Saensuk municipality between 2006-2011.

User Type	Year : Waste Water Volume (cubic meter/day)	
	2006	**2011**
1. Population in municipality	14,179	16,309
2. One-day Tourist	1,310	1,403
3. Overnight Tourist	2,144	2,298
Total	**17,633**	**20,010**

Source: TAT (1997)

- Garbage collection

There are 2 eliminated methods as stacking up on the ground and sanitary landfill. Presently, land for rubbish elimination is 5 rais and locates in Mueng sub-district, Muang district which locates 15 kilometers far from municipality. The land is owned by private sector and cannot handle more rubbish. Municipality had brought reserved land since 1988 for rubbish elimination with the area of 167 rais locates in Bang Phra sub-district, Si Racha district. It locates 10 kilometers far from municipality. Revenue from rubbish collection is about 1,740,000 Baht per year.

The rubbish volume by population in Saensuk municipality in year 2011 is 0.8 kilograms per person per day. Therefore it will have rubbish for elimination about 43.49 tons per day from 54,364 persons. Rubbish volume from tourists in the same year by the estimation on total number of tourist is about 33,417 persons per day in weekends divided into one-day trip for 0.66 kilograms per person and overnight type for 0.8 kilograms per person which is equals to the population of municipality. Therefore it will have 14.47 tons of rubbish from one-day trip tourists and 9.19 tons from overnight tourists. Total rubbish for elimination is about 67.15 tons.

From rubbish volume estimation, it is necessary to use the area for 163 rais at 5 meters deep to prepare for sanitary landfill which will increase in the next 15 years. At the same time, municipality had brought 167 rais of land which is adequate for handling rubbish up to 2011.

Table 2-9 Represent estimation on rubbish volume in Saensuk municipality between 2006-2011.

User Type	Year : Rubbish Volume (tons/day)	
	2006	**2011**
1. Population in municipality	37.81	43.49
2. One-day Tourist	13.50	14.47
3. Overnight Tourist	8.58	9.19
Total	**59.89**	**67.15**

Source: TAT (1997)

2.1.10 Tourism

2.1.10.1 Tourist Spots within Saensuk Municipality Area

Tourism is an important economic industry of Saensuk municipality because tourism makes more spreading of income to locality. It also makes job employment, career establishment and motivation more investment to the area. As Saensuk municipality is the location of many important tourist spots.

- Marine Science Institute

It locates inside the Burapha University area and consists of water creature museum and salt water breeding place for study and research which opens daily for tourists except Monday. It also has officer to explain the visitors. Form visitor statistic in 2005 found out that there were 180,703 visitors, especially in April and October which had the most visitors.

- Bangsaen beach

It is famous and popular among tourist for long time and locates 13 kilometers far from Chonburi city. Beach area is about 2.5 kilometers long and 50-200 meter wide. It consists of full facilities as accommodations, bungalow, fresh water bathroom, seafood restaurants and water sport equipment as banana boat, scooter, hoops and rental bicycle. Presently, Bangsaen beach has been developed in scenario

adjustment along the beach side by coconut tree, beach side discipline, cleanness and standard selling price in creating sustaining tourism atmosphere.

- Laem Tan

It is a place for enjoying natural beauty which locates next to Bangsaen beach on the north. Neighboring area is guest houses of various government units.

- Kao Summuk

It is locates in the north of Bangsaen beach. Sammuk Female Guardian Spirit Shrine which is located on the cliff next to the sea is respected and admired by general public. This tourist spots has a story about love that a young couple died together in this place which they had sworn to each other. This area has a lot of wild monkeys. Tourists who visited Bangsaen always watch the wild monkeys, feeding banana and worship Kao Sammuk Femal Guardian Spirit or having seafood before leaving. Presently there are 2 scenario viewing point on Kao Summuk including mountain foot side which has car terminal station of LAN Phratawee for the developing to become coach service unit.

- Nongmon

It is a famous market, selling local products and souvenirs of Chonburi province as dry seafood, bamboo sticky rice, steamed fish with coconut milk package, oyster and desserts, located on Sukhumvit road around the junction, entrance to Bangsaen beach which is the passing road of tourists which help in promoting another important local place in economy system of the province.

2.1.10.2 Number of Tourist

Most tourists travel to Bangsaen beach are local Thai tourists especially the one who resides the adjoining province such as Bangkok (TAT, 2005), because the tourist spot does not far from the city, convenience for traveling including variety of tourist spots for selection.

The increment of tourists continue since 1976 which is the report from the on Bangsaen beach environmental quality improvement by National Environment Committee Office found out that there are 15,068 tourists visit Bangsaen beach in weekends period. In 1990, Chulalongkorn University (TAT, 1997) has studied the suitability on the investment of relaxation place in Bangsaen, Kao Summuk and Laem Tan found out that there were 1,374,360 tourists by increasing rate of 4.16% per year. And then the survey of study group in 1996 found out that there were more 2,188,416 tourists. From this information can be used in estimation on number of tourists in 2011 as 3,208,013 persons by average of 33,417 persons per day.

Besides number of tourists are not stable and number of foreign tourists trend is decline simultaneously. Therefore the cooperation between responsible unit of each tourist spot around Bangsaen beach is necessary in developing and adjusting for marketing the linkage and continuing of tourism activities including more variety such as linkage road development between tourists, coach arrangement together with the cooperation in tourists spot conservation which is a path in making tourism in project area to operate in line with same direction as well as awakening on investment (TAT, 1997).

From the condition in opening Bangsaen beach area as tourists spot, to have a lot of inside and outside tourists and a trend for expanding in the future. The deterioration in natural resources should be bewared and protected carefully. At the same time main responsible unit is only Saensuk municipality which has to handle the problem directly such as there will be rubbish flowed to sea beach in summer monsoon period, lacking of awareness in cleanness of tourists, lacking in discipline in parking along Bangsaen road 1 and inadequate personnel in environment which always ask the assistant from other units. Therefore it is an emergency thing to consider and revise the development on ability for handling tourism expansion and having specific organization to manage the problems.

2.1.11 Overall Condition of Saensuk Municipality

Saensuk municipality area is the location of important tourist spot and revenue supported source of locality such as Bangsaen beach, Nongmon and Kao Sammuk which are under local government administration as municipality. If consider specifically on Bangsaen beach area, found out that, although the seawater is standard, there are dirtiness from various origins and they are rubbish increment according to the number of tourists, red tide, crowded at beach area, visual pollution including crowded traffic problem, which are the problems and expected to be continue in the future. Management by local administration alone may not enough for the operation. It is necessary to corporate with various parties, among government unit, private sector, tourists as well as local people in maximizing the efficiency of the system and in line with ability of locality. The cooperation will be a factor in supporting and enforcing the development to the area in the future, they are fundamental structure, income spreading, maintaining good culture in locality as well as unique and completion of tourist spots which can attract tourists and maintain good condition of tourist spots to be last long.

2.2 Basic Concepts of Economic Value

Dennis and Marisa (2002) stated that economic value is one of many possible ways to define and measure value. Although other types of value are often important, economic values are useful to consider when making economic choices - choices that involve tradeoffs in allocating resources. Measures of economic value are based on what people want - their preferences. Economists generally assume that individuals, not the government, are the best judges of what they want. Thus, the theory of economic valuation is based on individual preferences and choices. People express their preferences through the choices and tradeoffs that they make, given certain constraints, such as those on income or available time.

The economic value of a particular item, or good, for example a loaf of bread, is measured by the maximum amount of other things that a person is willing to give up

to have that loaf of bread. If we simplify our example "economy" so that the person only has two goods to choose from, bread and pasta, the value of a loaf of bread would be measured by the most pasta that the person is willing to give up to have one more loaf of bread.

Thus, economic value is measured by the most someone is willing to give up in other goods and services in order to obtain a good, service, or state of the world. In a market economy, dollars (or some other currency) are a universally accepted measure of economic value, because the number of dollars that a person is willing to pay for something tells how much of all other goods and services they are willing to give up to get that item. This is often referred to as "willingness to pay."

In general, when the price of the goods increases, people will purchase less of that good. This is referred to as the law of demand - people demand less of something when it is more expensive (assuming prices of other goods and peoples' incomes have not changed). By relating the quantity demanded and the price of a good, we can estimate the demand function for that good. From this, we can draw the demand curve, the graphical representation of the demand function.

It is often incorrectly assumed that a good's market price measures its economic value. However, the market price only tells us the *minimum* amount that people who buy the good are willing to pay for it. When people purchase a marketed good, they compare the amount they would be willing to pay for that good with its market price. They will only purchase the good if their willingness to pay is equal to or greater than the price. Many people are actually willing to pay more than the market price for a good, and thus their values exceed the market price.

In order to make resource allocation decisions based on economic values, what we really want to measure is the net economic benefit from a good or service. For individuals, this is measured by the amount that people are willing to pay, *beyond* what they actually pay. Thus, two goods that sell for the same price may have different net benefits.

The economic benefit to individuals is often measured by consumer surplus. The figure 2-1 is represented by the area under the demand curve for a good, above its price.

The economic benefit to individuals, or consumer surplus, received from a good will change if its price or quality changes. For example, if the price of the good increases, but people's willingness to pay remains the same, the benefit received (maximum willingness to pay minus price) will be less than before. If the quality of a good increases, but price remains the same, people's willingness to pay may increase and thus the benefit received will also increase.

Economic values are also affected by the changes in price or quality of substitute goods or complementary goods. If the price of a substitute goods changes, the economic value for the good in question will change in the same direction. For example, wheat bread is a close substitute for multi-grain bread. So, if the price of multi-grain bread goes up, while the price of wheat bread remains the same, some people will switch, or substitute, from multi-grain to wheat bread. Therefore, more wheat bread is demanded and its demand function shifts upward, making the area under it, the consumer surplus, greater.

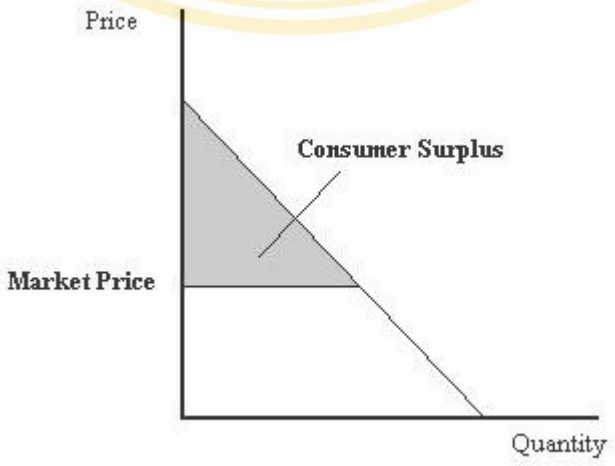


Figure 2-1 Represent demand curve and consumer surplus

Similarly, if the price of a complementary good, one that is purchased in conjunction with the good in question, changes, the economic benefit from the good will change in the opposite direction. For example, if the price of butter increases, people may buy less of both bread and butter. If less bread is demanded, then the demand function shifts downward, and the area under it, the consumer surplus, decreases.

Producers of goods also receive economic benefits, based on the profits they make when selling the good. Economic benefits to producers are measured by producer surplus, the area above the supply curve and below the market price. The supply function tells how many units of the good producers are willing to produce and sell at a given price. The supply curve is the graphical representation of the supply function. Because producers would like to sell more at higher prices, the supply curve slopes upward.

If producers receive a higher price than the minimum price they would sell their output for, they receive a benefit from the sale - the producer surplus. Thus, benefits to producers are similar to benefit to consumer, because they measure the gains to the producer from receiving a price higher than the price they would have been willing to sell the good for.

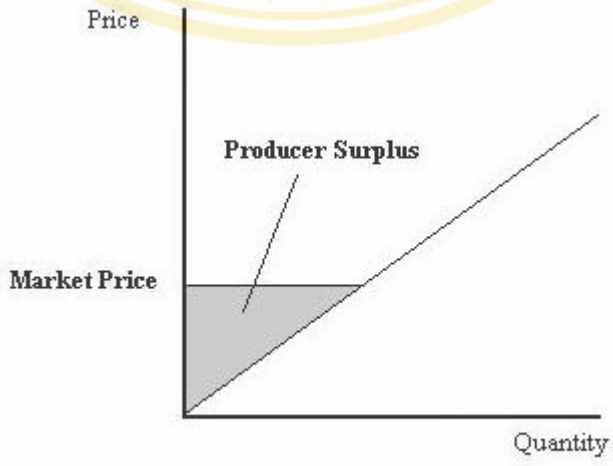


Figure 2-2 Represent supply curve and producer surplus

When measuring economic benefits of a policy or initiative that affects an ecosystem, economists measure the total net economic benefit. This is the sum of consumer surplus plus producer surplus, less any costs associated with the policy or initiative.

2.3 Valuation of Ecosystem Services

Ecosystem valuation can be a difficult and controversial task, and economists have often been criticized for trying to put a "price-tag" on nature. However, agencies in charge of protecting and managing natural resources must often make difficult spending decisions that involve tradeoffs in allocating resources. These types of decisions are economic decisions, and thus are based, either explicitly or implicitly, on society's values. Therefore, economic valuation can be useful, by providing a way to justify and set priorities for programs, policies, or actions that protect or restore ecosystems and their services.

2.4 Ecosystem Values

Ecosystem values are measures of how important ecosystem services are to people - what they are worth. Economists measure the value of ecosystem services to people by estimating the amount people are willing to pay to preserve or enhance the services. However, this is not always straightforward, for a variety of reasons.

Most importantly, while some services of ecosystems, like fish or lumber, are bought and sold in markets, many ecosystem services, like a day of wildlife viewing or a view of the ocean, are not traded in markets. Thus, people do not pay directly for many ecosystem services. Additionally, because people are not familiar with purchasing such goods, their willingness to pay may not be clearly defined. However, this does not mean that ecosystems or their services have no value, or cannot be valued in dollar terms.

It is not necessary for ecosystem services to be bought and sold in markets in order to measure their value in money. What is required is a measure of how much purchasing power people are willing to give up to get the service of the ecosystem, or how much people would need to be paid in order to give it up, if they were asked to make a choice similar to one they would make in a market.

2.5 Types of Values

Economists classify ecosystem values into several types. The two main categories are use values and non-use, or "*passive use*" values. Whereas use values are based on actual use of the environment, non-use values are values that are not associated with actual use, or even an option to use, an ecosystem or its services.

Thus, ***Use value*** is defined as the value derived from the actual use of a good or service, such as hunting, fishing, bird-watching, or hiking. Use values may also include indirect uses. For example, an Alaskan wilderness area provides direct use values to the people who visit the area. Other people might enjoy watching a television show about the area and its wildlife, thus receiving indirect use values. People may also receive indirect use values from an input that helps to produce something else that people use directly. For example, the lower organisms on the aquatic food chain provide indirect use values to recreational anglers who catch the fish that eat them.

Option value is the value that people place on having the option to enjoy something in the future, although they may not currently use it. Thus, it is a type of use value. For example, a person may hope to visit the Alaskan wilderness area sometime in the future, and thus would be willing to pay something to preserve the area in order to maintain that option.

Similarly, bequest value is the value that people place on knowing that future generations will have the option to enjoy something. Thus, bequest value is measured by people's willingness to pay to preserve the natural environment for future

generations. For example, a person may be willing to pay to protect the Alaskan wilderness area so that future generations will have the opportunity to enjoy it.

Non-use values, also referred to as "passive use" values, are values that are not associated with actual use, or even the option to use a good or service. Existence value is the non-use value that people place on simply knowing that something exists, even if they will never see it or use it. For example, a person might be willing to pay to protect the Alaskan wilderness area, even though he or she never expects or even wants to go there, but simply because he or she values the fact that it exists.

It is clear that a single person may benefit in more than one way from the same ecosystem. Thus, total economic value is the sum of all the relevant use and non-use values for a good or service.

2.6 Travel Cost Method (TCM)

There are various economic valuation methods to place the value an ecosystem special in terms of monetary value. Travel Cost Method is reliable and acceptable method and it is mostly implemented in developed countries. The travel cost method uses differences in travel and other costs to individuals making use of a recreation site to infer the recreational value of the site (Clawson, 1959). The method takes advantage of the fact that, in most cases, a trip to a recreation site requires an individual to incur cost in terms of travel, entry fee, on-site expenditures and time. Different individuals incur different costs to visit different sites, and these implicit prices can be used in place of conventional and market prices as the basis for estimating the value of recreation sites and changes in their quality.

Simple travel cost models attempt to estimate the number of trip to a site or sites over some period of time. There are two variants of the model. The first can be used to estimate representative individual's recreation demand functions. This is done by observing the visitation rate of individuals who make trips to a recreational facility, as a function of the travel cost. The value of a recreation site to an individual is

measured by the area under his of her demand curve, so that the total recreation (use) value of a site is simply the area under each demand curve summed over all individual travel cost model requires that there is variation in the number of trips individuals make to the recreational site, in order to estimate the demand function. One particular problem therefore arises from the fact that such variation is not always observed, especially since some individuals do not make any trip.

A different approach is known as the zonal travel cost method. The unit of observation is now the zone, as opposed to the individual. The visitation rate used is the number of trips per capita from each zone. Zones are constructed by dividing the region around a site into area of increasing travel cost. The observations of trips are then allocated to their zone of origin, and the population of each zone. The visitation rate is calculated by dividing the number of trips from each zone by the population in the zone.

In both variants of the simple model, the demand curves are estimated by undertaking statistical regression analysis, relating visitation rates to socioeconomic characteristics (for example income), estimates of the costs of visiting a site, and some indicator of site quality. The area under the demand curves provides a measure of consumer surplus. Unless the site being valued is unique, most individuals will have access to a range of substitute sites that they could use for the same or similar activities (Pearce and Barbier, 2000).

2.7 Advantages of the Travel Cost Method

- The travel cost method closely mimics the more conventional empirical techniques used by economists to estimate economic values based on market prices.
- The method is based on actual behavior, what people actually do, rather than stated willingness to pay, what people say they would do in a hypothetical situation.
- The method is relatively inexpensive to apply.

- On-site surveys provide opportunities for large sample sizes, as visitors tend to be interested in participating.
- The results are relatively easy to interpret and explain.

2.8 Issues and Limitations of the Travel Cost Method

- The travel cost method assumes that people perceive and respond to changes in travel costs the same way that they would respond to changes in admission price.
- Defining and measuring the opportunity cost of time, or the value of time spent traveling, can be problematic. Because the time spent traveling could have been used in other ways, it has an “opportunity cost”. This should be added to the travel cost, or the value of the site will be underestimated. However, there is no strong consensus on the appropriate measure - the person’s wage rate, or some fraction of the wage rate - and the value chosen can have a large effect on benefit estimates. In addition, if people enjoy the travel itself, then travel time becomes a benefit, not a cost, and the value of the site will be overestimated.
- The most of simple model assume that individuals take a trip for a single purpose - to visit a specific recreational site. Thus, if a trip has more than one purpose, the value of the site may be overestimated. It can be difficult to apportion the travel costs among the various purposes.
- The availability of substitute sites will affect values. For example, if two people travel the same distance, they are assumed to have the same value. However, if one person has several substitutes available but travels to this site because it is preferred, this person’s value is actually higher. Some of the more complicated models account for the availability of substitutes.
- Those who value certain sites may choose to live nearby. If this is the case, they will have low travel costs, but high values for the site that are not captured by the method.
- Interviewing visitors on site can introduce sampling biases to the analysis.

- Measuring recreational quality, and relating recreational quality to environmental quality can be difficult.
- Standard travel cost approaches provides information about current conditions, but not about gains or losses from anticipated changes in resource conditions.
- In order to estimate the demand function, there needs to be enough difference between distances traveled to affect travel costs and for differences in travel costs to affect the number of trips made. Thus, it is not well suited for sites near major population centers where many visitations may be from "origin zones" that are quite close to one another.
- The travel cost method is limited in its scope of application because it requires user participation. It cannot be used to assign values to on-site environmental features and functions that users of the site do not find valuable. It cannot be used to value off-site values supported by the site. Most importantly, it cannot be used to measure nonuse values. Thus, sites that have unique qualities that are valued by non-users will be undervalued.
- As in all statistical methods, certain statistical problems can affect the results. These include choice of the functional form used to estimate the demand curve, choice of the estimating method, and choice of variables included in the model.

2.9 Recreational Carrying Capacity

“Recreational Carrying Capacity” has been defined in a number of ways; one useful definition is “level of use beyond which impacts exceed standard” (Shelby and Herberlein, 1986). Using Shelby and Herberlein’s method of measuring recreation carrying capacity, capacity levels are developed in four capacity type: ecological, physical/spatial, facility, and social. Based on these capacity types, limiting factors are identified to establish the level at which recreation use will reach capacity.

It is useful to distinguish between four types of carrying capacity in recreation settings. These four types are differentiated by decision about which kinds of impact are important (Shelby and Herberlein, 1986):

- ***Ecological Capacity :*** concerned with the impacts of recreation on the ecosystem, such as the percent of specific types of ground cover, number of certain plants or animal observed, soil compaction, and soil erosion.
- ***Physical /Spatial Capacity :*** concerned with the impacts of available space on recreation, such as number of people per square foot of flat sleeping area, number of people per acre or square mile, camping parties per beach, or number people per critical area.
- ***Facility Capacity :*** concerned with facility impacts, such as number of people, group or vehicles per boat lamp, rest rooms, parking lots, or campgrounds, visitor-staff ratio, percent of occupancy for various facilities, wait time to use facilities, or number campground refusals, and sewer and water infrastructure.
- ***Social Capacity :*** concerned with visitor's perceptions of surrounding recreational use and consider factor, such as encounters with other parties per hour or day, number of encounter with groups of a particular size or type, percent of nights camped away for others, percent of attraction site where people are beyond sound and sight of others, or number of people encountered at each attraction site

2.10 The Concept of Carrying Capacity

The concept of recreational carrying capacity is based on a general statement that any form of development within the carrying capacity of ecosystem means a sustainable development. That fits in a general definition of *sustainable development* as:

a form of development which uses the natural ecosystem as resources of production and consumption growth leaving them unchanged for the future generation, or more simply, defines it

a development within the carrying capacity of ecosystem.

According to such general definition of carrying capacity and sustainable development, *sustainable development of tourism* can be defined as:

a form of tourism development which uses natural resources and cultural heritage to increase the number of visitors and the profit from tourist activities, but preserves them for the future generations,
or as

a development of tourism within the carrying capacity of tourism resources.

The desirable sustainable tourism development function as a kind of compromise between generally intensive forms of tourism development promoted mainly by investors/entrepreneurs and generally restricted forms of tourism development promoted mainly by ecologists. Such a methodology has a starting point in a view that the assessment of limits for carrying capacity can rarely be measure precisely, it is almost always judged subjectively depending on which view is represented by subjects responsible for the assessment (UNEP, 1999).

2.11 Carrying Capacity Assessment Process (C-CAP)

The process has some common elements with other resource planning or assessment processes, including the limits of acceptable change (Stankey and McCool, 1984) and visitor impact management (Graefe et al, 1983) schemes.

(1) ***Organize and evaluate background information.*** This process includes existing information on the geographic context, management structures, political climate, use patterns and trends, and so on

(2) ***Identify in general terms the type of experience opportunity to be provided.*** This includes a review of legal mandates, agency guidelines, and

management objectives, as well as the spectrum of recreation opportunities possible within resource capabilities. Establishing capacity requires a single objective or a compatible set of objectives: disagreement about what should be provided constitutes a use conflict which must be resolved first. Data collect later will help to further refine and specify management objective.

(3) ***Identify important impacts-*** ecological, physical, facility, or social. Sources for this information may include the public at large, interest groups, managers, agency records and files, etc. The task here is to specify current or anticipated problems or the unique characteristics or values of the resource. This list should be narrowed down to a group of measurable impact parameters for which data will be collected.

(4) ***Collect data*** in following categories

a. Type of experience opportunity to be provided, if not clearly specified in step 2. This kind of information is particularly helpful where there is disagreement about management objectives, either between managers and the public or among public interest groups. These data will help document the extent of agreement or disagreement. Results here should be used in conjunction with information from step 2 to refine management objectives and resolve conflicts.

b. Evaluative standards. The standards should be developed for the critical impacts identified in step 3.

c. Existing conditions. Collect data shows the range of variation for management parameters and impact parameters as well as the relationships between these variables. This will document the extent of current impacts and suggest the management strategies which might help control them.

(5) ***Develop management alternatives*** which would limit impacts to acceptable levels. These alternatives should include use limits and other management strategies which would control impacts.

(6) ***Select a management strategy.*** If the strategy includes a use limit, that level of use is the carrying capacity, if other management parameters are use to help control impacts, they should be specified as part of the management plan.

(7) ***Monitoring impacts*** to insure that they fall within acceptable limits and adjust management policies if necessary.

2.12 Physical Carrying Capacity (PCC)

Ceballos (1996) stated Physical Carrying Capacity is the maximum number of users that can physically fit into or onto the site, over a particular time. The formula as follows;

$$PCC = \frac{A \times Rf}{a}$$

Where

A = Available area for public use

Rf = Rotation factor (number of visit per day)

a = area required per user

To measure the PCC, the following assumptions must be clarified,

a : the area required by recreational users to undertake activities

A : that the available area (A) is determined by the particular conditions of the site, and by limitations imposed due to fragility or as a result of the need for safety precaution

Rf : the rotation factor is the number of permissible daily visits to the site, determined by

Rf = Open period / (Average time of utilization/ visit)

Lowson and Band-Bovy (1977) studied about the usual standards for beach capacity (facilities not included). The result of study as show in table 2-10

Table 2-10 Usual Standards for Beach Capacity

Area required per user (sq.meters/user)	Beach Density (users/Rai)	Notes
3	533.33	Over density
4	400	
5	320	Public beach near town
8	200	Public beach (average)
10	160	Resort (low standard)
15	106.67	Resort (medium standard) Public beach (high standard)
20	80	Resort (comfort)
30	53.33	Resort (deluxe)

Source: Lowson and Band-Bovy (1977)

2.13 Related Researches

2.13.1 Research in Valuation

In researches conducted in Thailand in the past, it was found that most of them were study that separated between economic valuation and carrying capacity, namely, studying specifically about economic value or specifically about carrying capacity. For Thailand, it began study in the area of an assessment of environmental value which the first piece of research was conducted in the year of 1981 by using ZTCM in assessment of value of Lumpinee Park (Eutrirak, 1981). Afterwards, there was more study consequently whether they would be researches or thesis (see Appendix A). Regarding examples of study results involved with an assessment of environmental value both domestic and abroad, they were as follow;

Eutrirak (1981) studied about measurement of use value of Lumpinee Park by TCM and CVM for option value and existence value. Single closed bidding was used for interviewing about WTP. The study result found out that value of Lumpinee Park, which was evaluated by TCM in 1980 was approximate 11.93 million baht/year. And option value and existence value by CVM for users was approximate 11.47 million baht/year and for non-users was approximate 88.02 million baht/year. If government still continued to preserve Lumpinee Park area, the present value at the discount rate of 15% and 18% for service users and non-users were equal to 63.7-79.6 million baht and 489.1-586.8 million baht, respectively.

Limprayoon (1994) had studied to find value of National Park of Laemya Islands, Rayong province by an assessment of values of the park in 3 parts i.e., use value, option value and existence value with TCM and CVM by using 5 patterns of inquiring technique i.e., open-ended, close-ended single low value, closed-ended single high value, close-ended iterative low value and close-ended iterative high value with tourists sample group in number of 300 samples. The result of this study found out that use value by using TCM was 27.15 million baht/year and by using CVM was 23.06 million baht/year. Besides, option value was approximate 108.53 million baht/year and existence value was 3,604.86 million baht/year. Finally, the total value of National Park of Laemya Islands was approximate 3,738.88 million baht/year.

This study summarized suggestions for study and research in the future that the scope of samples studied was important and, for the purpose to get accurate data and value reflection of real natural tourism sources, scope of additional samples should be used. In addition, there was a suggestion to study by sampling tourists who came to visit on regular working days.

TDRI and HIID (1995a) evaluated Khao Yai National Park by measuring use value of tourism and various recreational activities by TCM and CVM. And they measured option value and existence value by dividing sample group into 2 groups comprising users and non-users and used open-ended and close-ended interactive technique for questioning. The study results found out that Thai tourists were willing

to pay 22 baht/person/time and 730 baht/person/year for conserving Khao Yai. While other Thais who were not tourists willing to pay 183 baht/person/year for conserving a National Park. Besides people who think they will visit Khao Yai in the future were willing to pay 196 baht/year. Total economic value of Khao Yai National Park was approximate 3,080 million baht/year or 35,000 million baht/year in the present value at the discount rate of 10%.

Willis and Garrod (1991) studied by using ZTCM and ITCM in finding consumer surplus to forest. In consideration of ZTCM, equations used were as follow;

$$\mathbf{V_{hi} / P_h = f(Ch_i, S_h, A_{ik})}$$

Where;

V_{hi} = number of visit from zone h to forest i

P_h = number of population in zone h

Ch_i = travel cost from zone h to forest i

S_h = socioeconomic feature of population in zone h

A_{ik} = quality of forest i that associated with park k

In addition, ITCM equations used were as follow;

$$\mathbf{V_{im} = f(C_{im}, M_m, F_m, G_m, N_m, P_{im}, E_{im}, L_{im}, A_m, Y_m)}$$

Where;

V_{im} = number of visit of m to forest i

C_{im} = travel cost of m to forest i

M_m = to be member of environmental institute

F_m = selection to visit forest of m

G_m = selection to visit non forest of m

N_m = size of party of m

P_{im} = objective to visit of m

E_{im} = number of day to stay in forest of m

L_{im} = number of hours for recreation at forest i

A_m = age of m

Y_m = income of m

Table 2-11 The use value of forest by using ZTCM and ITCM

Forest	ZTCM	ITCM
Brecon	$2.60	$0.66
Buchan	$2.26	$0.20
Cheshire	$1.91	$0.06
Lome	$1.44	$0.96
New Forest	$1.43	$0.12
Ruthin	$2.52	$0.88

Source: Willis and Garrod (1991)

Study results as above mentioned represented that values of forest obtained from ZTCM and ITCM were different. Value of forest from ZTCM had more value than that of ITCM rather considerable.

Erol and Kaln (1988) evaluated value of deer hunting by using TCM. The variable of this study were socioeconomic variables, quality of deer hunting variables and travel cost. Sample groups in number of 7,516 samples were used in this study. The different method, i.e., Ordinary least square (OLS) and Maximum-Likelihood (ML), was compared. The result showed value from OLS was approximate 1,063 $US/year would have value closer to ML that was approximate 1,043 $US/year.

Costanza et al (1989) evaluated all system of mangrove forest in Louisiana, USA by calculating direct use value and indirect use value of fishery, hunting recreation, preventing storm by using various evaluation technique. For example, a model of marginal productivity was used to calculate value of fishery resources such as crab and fish. Value deriving from being recreational place used CVM by

questioning about the value of WTP for visiting area, playing sport, hunting, fishery photographing together with TCM and preventing storm which calculate from damage cost. A result appeared that value of total benefits was 2,429 $US/hectare/year (considering interest rate at 8%). Value deriving from fishery was 317 $US/hectare/year (13.50% of total value). Value deriving from hunting was 151 $US/hectare/year (6.21% of total value). Value deriving from recreational place was 1,915 $US/hectare/year (78.84% of total value).

From study in the past concerning an assessment of values of public goods that had no markets in selling, buying and exchanging, most of them tended to use method of value assessment of goods by TCM or CVM or both for comparison to each other. Besides, most of studies weighed the importance to an assessment of use value of goods. There were only some pieces of study that weighed the importance of and studied of existence values.

Variables in study were another one that were important in studying in which variables in assessment of values would be different according to aspects of goods that were required to assess values which variables used in researches in the past were social variables such as age, sex, income, education. Economic variables were revenues and behavioral variables were, such as, tourism objectives and product quality variables were, such as, quality of deer hunting.

For research study in aboard that use TCM method, goods values would be assessed only by use value in which most of studied would use TCM solely. There was a few studied that compared ZTCM and ITCM which result of study was found that use value obtained from ZTCM had more value than that of ITCM and use value obtained from ITCM would have value closer to an assessment by CVM than ZTCM because assumption used in ZTCM assessment stating that persons who were in the same zone having the same economic and social attributes throughout various behaviors might be not consistent with the reality. In addition, in studying to find our economic values, it was found that values obtained were different due to methods of

study used. Therefore, in this study, it was these studied by ZTCM and ITCM to see the difference between values obtained from such both study methods.

2.13.2 Research in Carrying Capacity

FERS (1993) studied the Recreational Carrying Capacity (RCC) in service area and recreation area wholly of Bhukradueng National Park, Loei province. In service area, Facility Carrying Capacity was assessed which was considered from current sufficiency of numbers of overnight staying places, parking lots, bathrooms, food shops, ability in disposal of waste and quantity of water consumption and utilities while recreation area assessed Physical Carrying Capacity (PCC) by representing physical basic data and utilization to determine carrying capacity by considering jointly with Social Carrying Capacity (SCC).

For study results when it was considered from rates of tourist dispersion to various touring points together with carrying capacity in various areas of each point of tourism, they consisted of quantity of requirement to visit particularly 3 important cliffs where they might be regarded as a figure of Bhukradueng which had been brought to use as a base in determining the whole carrying capacity of Bhukradueng which was found that it was able to accommodate in the quantity of 1,500 accumulative tourists per day which this number of tourists, upon dispersion naturally to various tourism points, most of them did not exceed capability limit in accommodating every area except some tourism sources in category of waterfalls. There were still tourists in somewhat number exceeding Biological Carrying Capacity (BCC) but it was in a level that was possible. In this regard, it was done by adding measures of tourists' behavioral control both in area of environment study and regulations throughout punishment by the park authority to be in a broader extent.

From the study to evaluate RCC, most of study areas would be divided into 2 areas, they were, service area and recreation area but because this study was done only PCC area, namely, maximum number of tourists in which space or area could be accommodated in utilization by being able to be favourable for creating recreational

activities as required in which study results obtained represented in the form of number of tourists per appropriate recreational area. Therefore, this study was the study only recreational area which meant Bangsaen beach area in total distance of 2.5 kilometers long, 76 rai (TAT, 1997).

CHAPTER III
METHODOLOGY

Basically, this study was the research survey type that set up the objectives to estimate the recreation valuation and carrying capacity of Bangsaen beach, Chonburi province. The scope of methodology also implemented the standard methods regarding to the specific valuation and carrying capacity and followed by the steps of study as follow;

3.1 Methods
- 3.1.1 Zonal travel cost method
- 3.1.2 Individual travel cost method
- 3.1.3 Physical carrying capacity assessment

3.2 Sample design

3.3 Questionnaires design

3.4 Data collection

3.5 Data analysis

3.1 Methods

In this study, the estimate recreational use value was proceeds into ZTCM and ITCM. These methods are different as they are indicated in the following;

3.1.1 Zonal Travel Cost Method (ZTCM)

The zonal travel cost method is applied by collecting information on the number of visits to the site from different distances. Because the travel and time costs will increase with distance, this information allows the researcher to calculate the number of visit “purchased” at different “prices”. This information is use to construct

the *demand function* for the site, and estimate the *consumer surplus*, or economic benefits, for the recreational services of the site.

1. To define a set of zones surrounding Bangsaen beach by distance between visitor's province to Bangsaen beach.
2. To collect information on the number of visitors from each zone, and the number of visits made in the last year which can be used to calculate total visits per zone over the last year.
3. To calculate the visitation rates per 1000 population in each zone. This is simply the total visits per year from the zone, divided by the zone's population in thousands.
4. To calculate the average round-trip travel distance and travel time to the site for each zone. Assume that people in Zone 0 have zero travel distance and time. Each other zone will have an increasing travel time and distance. Next, using the average hourly wage multiply by total recreational time, as time cost, in all of total zone.
5. To estimate, using *regression analysis*, the equation that relates visitation rate to travel costs. From this, can estimate the demand function for the average visitor.
6. To construct the demand function for visits to the Bangsaen beach, using the results of the regression analysis. The first point on the demand curve is the total visitors to the site at current access costs (assuming there is no entry fee for the site).
7. To estimate the total economic benefit of the Bangsaen beach to visitors by calculating the consumer surplus, or the area under the demand curve.

The analysis of relationship between visitation rate and travel cost were utilized hypothesis model as follow;

$$\underset{(\,-\,)}{V_j} = f(TC_j) \quad \ldots (3\text{-}1)$$

Where

V_j = visitation rate (visit/1000/year) of zone j

TC_j = average travel cost of zone j

3.1.2 Individual Travel Cost Method (ITCM)

The individual travel cost model is a commonly used method to value recreational demand. It is based on the visitors are rational, i.e., their expected utility from the trip should be at least equal to the travel cost and the opportunity cost of their time. In an effort to value the recreational use value of Bangsaen beach, this study gathered information on the travel cost and time cost for each individual sampled. These data were useful to formulate a Trip Generation Function (TGF) (TDRI and HIID, 1995a), from which consumer surplus associated with each trip made to Bangsaen beach could be estimated next step.

3.1.2.1 Trip Generation Function (TGF)

The analysis of relationship between visitation rate and studied variables were utilized hypothesis trip generation function as follow;

$$V_i = \underset{(\,-\,)}{f(TC_i,} \underset{(+)}{Hours_i,} \underset{(+)}{Sex_i} , Education_i , Career_i , Income_i , Age_i) \quad \ldots (3\text{-}2)$$

Where

V_i = visitation rate (number of visit per year) of visitor i

TC_i	=	travel cost (transportation cost + expenditure +time cost) of visitor i
$Hours_i$	=	hour used during the visit of visitor i
Age_i	=	age of visitor i
Sex_i	=	sex of visitor i
$Education_i$	=	education level of visitor i
$Career_i$	=	career of visitor i
$Income_i$	=	monthly income of visitor i

Trip generation function had visitation rate as the dependent variable and independent variables representing;

1. Travel cost which includes round-trip expenses, transportation cost and time cost.
2. Hour used during the visit.
3. Socio-economic characteristics in this study are the respondent's: 1) age, 2) sex, 3) education level, 4) career, 5) income level.

These variables may influence a respondent's visitation rate in various ways. First, travel cost may be considered the price of recreation and was assumed to be negatively related to the visitation rate. Hour used during the visit may be another factor influencing trip frequency, i.e., those who have many hours used during the visit were likely to take more trips. It should be noted that the hour used during the visit might be have positive influenced the visitation rate. Income, as usual, was expected to have positive effect on the number of trips.

3.1.2.2 Estimating Consumer Surplus from the Trip Generation Function (TGF)

Estimating consumer surplus per trip can be done by integrating under the demand curve for trips (i.e., trip generation function). It is simple to show that the

consumer surplus per trip, assuming the linear relation between visitation and travel cost, was equal to;

$$CSi = \frac{(\alpha + \beta p_i^{o} + \delta x_i + \varepsilon_i)^2}{-2\beta} = \frac{(N)^2}{-2\beta} \quad \ldots (3\text{-}3)$$

Where N represents the average number of visit annually, and coefficient β represents the slope of the fitted curve (TDRI and HIID, 1995a).

3.1.3 Physical Carrying Capacity (PCC) Assessment

1. The assessment of beach perception was based on the analysis of the 3 questions in the survey.
2. To find the total beach area by using secondary data derived from TAT (1997).
3. To find optimum and maximum PCC on weekdays and weekends by using Ceballos's Formula

$$PCC = \frac{A \times Rf}{a} \quad \ldots (3\text{-}4)$$

Where

A = Available area for public use

Rf = Rotation factor (number of visit per day)

a = area required per user

3.2 Sample Design

The definition of population in this study was Thai tourists who visit to Bangsaen beach, Chonburi province and who may have a day trip or may have overnight trip. The design of sample size selection was introduced by using Yamane's Formula (Yamane, 1967);

$$n = \frac{N}{1 + N(e)^2} \quad \ldots(3\text{-}5)$$

Where;

n = number of sample size

N = total population number

e = acceptable error

Substitute these values into the equation;

1. Number of Thai tourist visited to Bangsaen beach in 2004 was 1,168,082 persons
2. Acceptable error was 0.05

Therefore, total sample size in this study was 400 samples.

3.3 Questionnaires Design

The questionnaire purposed to collect socioeconomic characteristics, behavior of traveling and crowding perception of respondents. The questionnaires were designed for 3 sections as follow;

Section I: Socioeconomic of respondent such as included age, sex, monthly income, career, education level and so on.

Section II: Behavior of traveling of respondent such as travel costs, tour characteristic, traveling method, number of entourage, tour reason, traveling frequency per year and so on.

Section III: Crowding perception was the number of the tourists present at the Bangsaen beach at the time of survey (crowding perception); with the answer range from 1 to 5 times of number of tourists at the time of survey.

(see Appendix B.)

3.4 Data Collection

The necessary data used in this study that complied from both primary and secondary data.

3.2.1 Primary data were mainly collected through the questionnaires by interviewing the respondents who were randomly selected around the Bangsaen beach area. The survey was carried out in December 2005-February 2006. The interviewers were well trained to have clear understanding in questionnaires. The questions were asked carefully to reduce any biases that might be occurred.

3.2.2 Secondary data were collected from the Tourism Authority of Thailand (TAT) and other related sources.

3.5 Data Analysis

The data were analyzed by descriptive analysis with EViews version 4.1 for Window was applied to analyzed and calculate the primary data from survey questionnaires in order to find out the respondents demand function for Bangsaen beach and identify significant variables, which influence their demand function and analyze with to Logistic Regression Analysis. The secondary data from Bangsaen beach were analyzed and calculated with an Excel for Window in order to find out recreational use value of Bangsaen beach.

CHAPTER IV
RESULTS AND DISCUSSIONS

This result of study of recreational valuation and carrying capacity of Bangsaen Beach, Chonburi province was presented into 3 sections as follow;

4.1 General characteristics of sampling groups
- 4.1.1 Socioeconomic characteristic of sampling group
- 4.1.2 Behavior of traveling of the sampling group

4.2 Valuation of recreational use value of Bangsaen beach, Chonburi province
- 4.2.1 Valuation of use value by ZTCM
  - The Trip Generation Function and related variable
  - Estimating recreational use value from ZTCM
- 4.2.2 Valuation of use value by ITCM
  - The Trip Generation Function and related variables
  - Estimating recreational use value from ITCM
- 4.2.3 Comparing use value from ZTCM and ITCM

4.3 Recreational Carrying Capacity Assessment
- 4.3.1 Estimating beach density of Bangsaen beach
- 4.3.2 Estimating PCC of Bangsaen beach in each period of time.

4.1 General Characteristics of Sampling Groups

4.1.1 Socioeconomic Characteristic of Sampling Groups

The socioeconomic characteristics of sampling group were classified by age, sex, education level, career and monthly income. The total 400 sampling groups were randomly selected from Thai tourists in Bangsaen beach areas.

The result of study showed that males were more than female in sampling group by 55.25% was male and 44.75% was female. Age of tourists sampling group were mostly 25-34 years old as 34.00%. Second to that age were 15-24 years old and 35-44 years old by 28.50% and 23.50% respectively. Mean age was 32 years old, the oldest sampling group was 69 years old and the youngest was 15 years old.

Mostly, income of sampling group was between 10,001 – 20,000 baht/month for 34.50% followed by under 10,000 baht/month as 27.25% and between 20,001 - 30,000 baht/month as 18.00%. While mean monthly income was 19,724 baht/month.

With respect to their career, most of the sampling groups were officer by 26.50%. Second to that career were student, own business and government officer by 25.25%, 17.75% and 15.50% respectively.

For sampling group's education level, it indicated education level of this sampling group had close proportion which consists of high school level, diploma and bachelor's degree by 27.50%, 29.50% and 32.50% respectively. Beside, the group of primary school was similar percentage to the group of master's degree at 5.25%. The results are shown in Table 4-1.

4.1.2 Behavior of Traveling of the Sampling Group

From the data analysis of sampling group found out that most were Bangkokian for 40.50%. Reason for traveling to Bangsaen, almost haft or 49.50% of sampling group indicated that it was near and convenient. Second reason was expense for 21.00%. Besides 14.75% indicated that satisfaction to easy accommodation and inexpensive.

Table 4-1 Percentage of questionnaire answer divided by socioeconomic characteristic

Socioeconomic Characteristics		Frequency	Percentage (%)
1. Sex	Male	221	55.25
	Female	179	44.75
2. Age (Year)	15-24	114	28.50
	25-34	136	34.00
	35-44	94	23.50
	45-54	35	8.75
	55-64	14	3.50
	> 64	7	1.75
3. Education	Primary School	21	5.25
	High School	110	27.50
	Diploma	118	29.50
	Bachelor's Degree	130	32.50
	Master's Degree	21	5.25
4. Career	Government Officer	62	15.50
	Student	101	25.25
	Own Business	71	17.75
	Merchant	11	2.75
	Housewife	20	5.00
	Employee	106	26.50
	Farmer	10	2.50
	Wage Earner	19	4.75
5. Income (Baht)	< 10,000	109	27.25
	10,001 – 20,000	138	34.50
	20,001 – 30,000	72	18.00
	30,001 – 40,000	37	9.25
	40,001 – 50,000	35	8.75
	> 50,001	9	2.25

Traveling characteristics were 24.50% travels with 2 entourages. For traveling method, 86.25% travels by personal car because it was a short distance. Beside, the group of travel by hired car was near percentage to the group of travel by public bus by 7.00% and 6.75% respectively. The frequency in traveling to Bangsaen, mostly were 1-2 times per year by 91.25%. It represents that Bangsaen was still popular for tourists. However most sampling group come to Bangsaen in one day trip for 82.25%, overnight tourists are 17.75% as shown in Table 4-2 – 4-7.

Table 4-2 Percentage of questionnaire answer as tourist divided by habitat

Habitat	Frequency	Percentage (%)
1. Bangkok	162	40.50
2. Middle region	139	34.75
3. East region	81	20.25
4. West region	11	2.75
5. Northeast region	7	1.75

Table 4-3 Percentage of questionnaire answer as tourist divided by tour reason

Reason	Frequency	Percentage (%)
1. Near and convenient for traveling	198	49.50
2. Inexpensive	84	21.00
3. Nice natural	54	13.50
4. Easy accommodation and inexpensive	59	14.75
5. Others	5	1.25

Table 4-4 Percentage of questionnaire answer as tourist divided by tour characteristic

Tour Characteristic	Frequency	Percentage (%)
1. One day	329	82.25
2. Overnight	71	17.75

Table 4-5 Percentage of questionnaire answer as tourist divided by number of entourage

Number of entourage (persons)	Frequency	Percentage (%)
1	96	24.00
2	98	24.50
3	62	15.50
4	47	11.75
5	27	6.75
> 6	70	17.50

Table 4-6 Percentage of questionnaire answer as tourist divided by traveling method

Traveling Method	Frequency	Percentage (%)
1. Personal Car	345	86.25
2. Hired Car	28	7.00
3. Public Bus	27	6.75

Table 4-7 Percentage of questionnaire answer as tourist divided by traveling frequency per year

Traveling frequency/Year (times)	Frequency	Percentage (%)
1	107	42.50
2	197	49.25
3	31	7.75
4	2	0.50

Bangsaen beach area is 2.5 kilometer long which is the most important tourism resource of Bangsaen beach with total area of 76 rais (TAT, 1997). Beach activities of this sampling group had close proportion which consists of swimming, walking, resting, scenario viewing, scooter diving and beach sports by 20.50%, 18.75%, 16.50%, 15.75%, 15.00% and 13.50% respectively, the results are shown in Table 4-8. Presently there are no clear boundaries for each activity.

The most of sampling group had a non side trip by 84.25% besides, there were a few sampling groups had a side trip which consists of Nongmon Market, Angsila, Summuk Hill and Pattaya Beach by 6.50%, 5.25%, 2.50% and 1.50% respectively as shown in Table 4-9.

Table 4-8 Percentage of questionnaire answer as tourist divided by beach activities

Beach Activity	Frequency	Percentage
1. Swimming	82	20.50
2. Walking	75	18.75
3. Resting	66	16.50
4. Scenario Viewing	63	15.75
5. Scooter Diving	60	15.00
6. Beach Sport	54	13.50

Table 4-9 Percentage of questionnaire answer as tourist divided by a side trip

Tourist Spot	Frequency	Percentage
1. Nongmon Market	26	6.50
2. Sammuk Hill	10	2.50
3. Angsila	21	5.25
4. Pataya Beach	6	1.50
5. Non-side trip	337	84.25

4.2 Valuation of Recreational Use Value of Bangsaen Beach

4.2.1 Valuation of Use Value by Using ZTCM

This study divided the sampling group into 6 zones by the distance from the origin province to Bangsaen beach as shown in Table 4-10.

Table 4-10 Division of study area into 6 zones

Zone	Distance to Bangsaen (km.)	Province	Frequency
1	0-50	Choburi Chachoengsao	57
2	51-100	Samutprakan Bangkok Rayong	204
3	101-150	Pathumthani Prachinburi Nakhonpathom	72
4	151-200	Ayuthaya Chanthaburi Nakornnayok	39
5	201-250	Saraburi Phetchaburi Kanchanaburi	21
6	251-300	Nakorn-Ratchasima	7

By the report of TAT, the number of tourists visited to Bangsaen beach in 2004 was 1,168,082 persons and visitation rate was 2.87 times/year (TAT, 2005). Therefore, total visit per year was 3,352,395 visits/year. The results are shown in Table 4-11 and Table 4-12.

Table 4-11 Calculate number of total visit per year of Bangsaen beach, Chonburi Province

Number of tourists visited Bangsaen beach annually (persons)*	Visitation rate (visits/person/year)	Total visit (visits/year)
1,168,082	2.87	= 2.87 x 1,168,082 = 3,352,395

* Source: TAT (2005)

Table 4-12 Zones' travel statistic

Zone	Visitation Rate (times/year)	Visit Ratio	Total Visit/ Year	Zone's population (persons)*	Visit/1000
1	3.18	0.19	635,375.45	1,821,722	348.78
2	2.54	0.54	1,814,856.95	7,299,201	248.64
3	2.26	0.17	572,188.94	2,075,888	275.64
4	1.64	0.07	224,663.14	1,496,845	150.10
5	1.10	0.02	80,738.32	1,884,809	42.84
6	1.00	0.01	24,572.53	2,547,653	9.65

* Source: DOPA (2005)

This study divided travel cost into 3 type i.e. transportation cost, expenditure and time cost. The result of this study found out that the tourists in Zone 1 had the least travel cost which was 1,447 baht/visit while the tourists in Zone 6 had the most travel cost which was 3,032 baht as shown in Table 4-13.

Table 4-13 Represent travel cost and visit/1000 in each zone.

Zone	Expenditure (baht/visit)	Time Cost (baht/visit)*	Travel Cost (baht/visit)	Visit/1000
1	1,233	214	1,447	348.78
2	2,183	255	2,438	248.64
3	2,151	378	2,529	275.64
4	2,559	414	2,973	150.10
5	3,328	406	3,734	42.84
6	3,032	514	3,546	9.65

* Time Cost = Hourly wage x Hours usage for travel

Travel distance covered by Zone 1 tourists was shorter than that of Zone 6 tourists, resulting lower traveling expenses paid by Zone 1 tourists. When considering time cost, we found that time cost for Zone 1 tourists was the lowest and that of Zone 6 tourists was the highest. This can be explained by the fact that traveling distance from Zone 6 to Bangsaen beach was the longest and, as a result, the visitors take the longest time to the beach. In another word, the longer the distance to Bangsaen beach, the higher value of travel cost.

4.2.1.1 Trip Generation Function (TGF) and related variable

The trip generation function had visitation rate (visit/1000/year) as the dependent variable and the independent variable as travel cost (baht/visit/trip). Travel cost may be considered the price of recreation and was assumed to be negatively related to the visitation rate as model below;

$$Vj = f(TCj)^{(-)} \quad \ldots (4\text{-}1)$$

Where;

Vj = Visitation Rate/ 1000 zone population/year

TCj = Travel Cost of tourists in zone j

From the above, it was able to find relationship between visitation rate (visit/1000/year) and travel cost (baht/visit) by using Ordinary Least Square (OLS) in term of Single Linear Regression. Table 4-14 represented the results of this estimation.

Table 4-14 Single linear regression analysis result on relationship between travel cost and number of visit (visit/1000) to Bangsaen beach, Chonburi province.

Variable	Coefficient	t-stat	P-value*
Constant	608.6940	9.017841	0.0008
Travel Cost	-0.154591	-6.597325	0.0027
R-squared		0.915833	
Adjusted R-squared		0.894792	
Durbin-Watson stat		1.529643	

* Statistics was significance at 0.05

Said relationship analysis result at the significant level of 0.05 could be written in equation 4-2.

$$\mathbf{Vj = 608.6940 - 0.154591\ TCj} \quad \ldots (4\text{-}2)$$

For estimation, it was able to conclude that visitation rate and travel cost had a linear relationship at a significant level of 0.05 and had relationship in an opposite direction, namely, when travel cost was increased 1 baht, it would make visitation rate reduce 0.15 times per 1000 populations.

Besides, travel cost was able to explain the change of visitation rate obtaining 89.48% (adjusted R-squared was 0.89) or could be stated that visitation rate had relationship with travel cost greatly.

4.2.1.2 Estimating recreational use value from the ZTCM

The demand curve of traveling to Bangsaen beach could be calculated from establishing travel cost to be changed in a manner of an increase and then considered that, at those travel cost, what quantity of visitation rate would be.

Table 4-15 represented calculation to find visitation rate in each zone with equation 4-2 when there was no tourists' travel cost change in Zone 1, there would have travel cost to Bangsaen beach equal to 1,447.17 baht/visit and there would have visit/1000 equal to 384.97 times/year and total visit would equal to 701,316.3 times/year and when there was an increase of travel cost to 50 baht, tourists in Zone 1 would have travel cost 1,497.17 baht/visit and there would have visit/1000 equal to 377.24 times/year or total visit would equal to 687,235.21 times/year.

When the same method of this calculation was used in other zones, it could be concluded that when travel cost was added to 50 baht visitation rate would be decreased from 3,282,539.09 times/year to 3,150,336.11 times/year as shown in Table 4-16.

Table 4-15 Calculation of total visit/year in each zone

Zone	Visit/1000		Total Visit/year	
	no added cost	added 50 baht/visit	no added cost	added 50 baht/visit
1	384.97	377.24	701,316.30	687,235.21
2	231.86	224.13	1,692,416.85	1,635,997.31
3	217.67	209.93	451,851.59	435,805.91
4	149.14	141.41	223,242.33	211,672.40
5	31.52	23.79	59,414.80	45,017.22
6	60.48	52.75	154,297.22	134,608.07
Total visit/year			3,282,539.09	3,150,336.11

In the same way, in case tourists' travel cost in every zone was conducted to be increased continuously until reaching a level of travel cost that made tourists no longer travel to Bangsaen beach or visitation rate will equal to zero, Table 4-16 represented relationship between added cost (baht/visit) and total visits/year. Then, bring relationship between increase travel cost and visitation rate to draw demand curve of traveling to Bangsaen beach as shown in Figure 4-1.

Table 4-16 Relationship between added cost (baht/visit) and total visit/year

Added Cost (Bht/visit)	Visit/zone/year						Total Visit/year
	1	2	3	4	5	6	
0	701,316	1,692,417	451,852	223,242	59,415	154,297	3,282,539
50	687,235	1,635,997	435,806	211,672	45,017	134,608	3,150,336
100	673,154	1,579,578	419,760	200,102	30,451	114,919	3,017,964
150	659,073	1,523,158	403,715	188,533	15,884	95,230	2,885,592
200	644,992	1,466,739	387,669	176,963	1,318	75,541	2,753,221
250	630,911	1,410,319	371,623	165,393		55,851	2,634,097
300	616,830	1,353,900	355,578	153,823		36,162	2,516,292
350	602,749	1,297,480	339,532	142,253		16,473	2,398,486
400	588,668	1,241,061	323,486	130,683			2,283,897
450	574,586	1,184,641	307,440	119,113			2,185,781
500	560,505	1,128,221	291,395	107,543			2,087,665
550	546,424	1,071,802	275,349	95,973			1,989,548
600	532,343	1,015,382	259,303	84,403			1,891,432
650	518,262	958,963	243,258	72,833			1,793,316
700	504,181	902,543	227,212	61,263			1,695,200
750	490,100	846,124	211,166	49,693			1,597,083
800	476,019	789,704	195,121	38,123			1,498,967
850	461,938	733,285	179,075	26,553			1,400,851
900	447,857	676,865	163,029	14,983			1,302,735
950	433,776	620,446	146,984	3,414			1,204,618
1000	419,694	564,026	130,938				1,114,659
1050	405,613	507,607	114,892				1,028,112
1100	391,532	451,187	98,847				941,566
1150	377,451	394,767	82,801				855,020
1200	363,370	338,348	66,755				768,473
1250	349,289	281,928	50,710				681,927
1300	335,208	225,509	34,664				595,381
1350	321,127	169,089	18,618				508,834
1400	307,046	112,670	2,573				422,288
1450	292,965	56,250					349,215
1500	278,884						278,884
1550	264,802						264,802
1600	250,721						250,721
1650	236,640						236,640
1700	222,559						222,559
1750	208,478						208,478
1800	194,397						194,397

Table 4-16 Relationship between added cost (baht/visit) and total visit/year (continue)

Added Cost (Bht)	Visit/zone/year						Total Visit/year
	1	2	3	4	5	6	
1850	180,316						180,316
1900	166,235						166,235
1950	152,154						152,154
2000	138,073						138,073
2050	123,992						123,992
2100	109,910						109,910
2150	95,829						95,829
2200	81,748						81,748
2250	67,667						67,667
2300	53,586						53,586
2350	39,505						39,505
2400	25,424						25,424
2450	11,343						11,343
2500							0

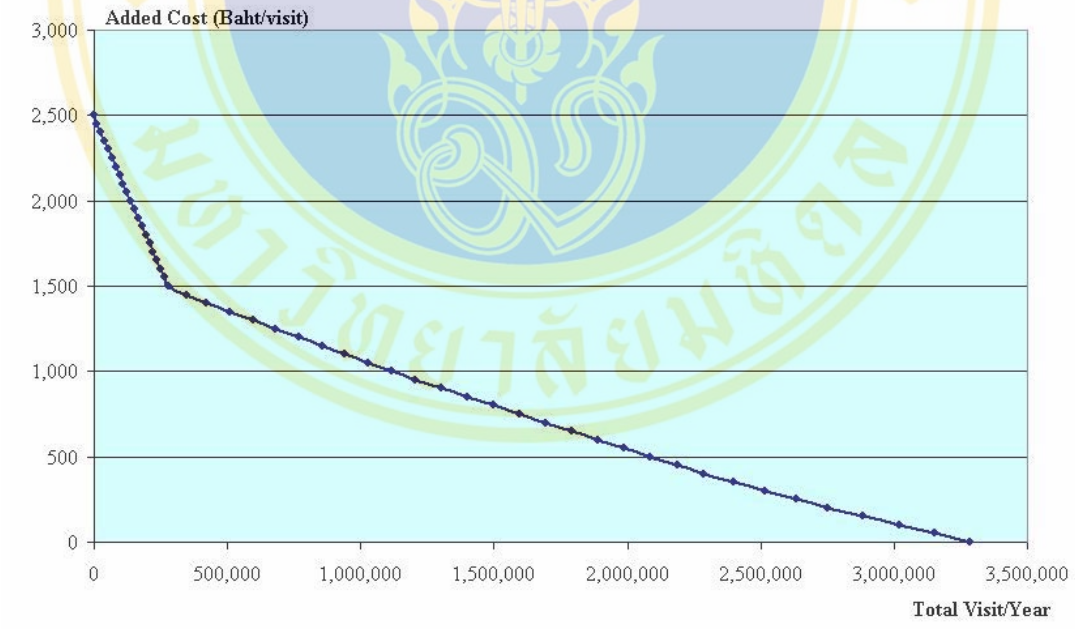


Figure 4-1 Demand curve of traveling to Bangsaen beach from ZTCM

Since an aspect of tendency of demand curve obtained from calculation was a line that had unequal slope throughout the line, finding an area under demand curve of traveling to Bangsaen beach was therefore calculated by finding sub-areas under demand curve that had different slope first or had different added cost (Y axis)

and total visit/year (X axis). Then, bring all of areas to be combined. The calculated area under demand curve was shown in Table 4-17.

Table 4-17 Calculation of the area under demand curve of Bangsaen beach, Chonburi province

Added Cost (Baht/Visit) : Y axis	Total visit/year : X axis	Area Under Demand Curve	Added Cost (Baht/Visit) : Y axis	Total visit/year : X axis	Area Under Demand Curve
0	3,282,539	0	1300	595,381	31,932,700.00
50	3,150,336	160,821,875.00	1350	508,834	27,605,375.00
100	3,017,964	154,207,500.00	1400	422,288	23,278,050.00
150	2,885,592	147,588,900.00	1450	349,215	19,287,575.00
200	2,753,221	140,970,325.00	1500	278,884	15,702,475.00
250	2,634,097	134,682,950.00	1550	264,802	13,592,150.00
300	2,516,292	128,759,725.00	1600	250,721	12,888,075.00
350	2,398,486	122,869,450.00	1650	236,640	12,184,025.00
400	2,283,897	117,059,577.05	1700	222,559	11,479,975.00
450	2,185,781	111,741,947.88	1750	208,478	10,775,925.00
500	2,087,665	106,836,135.44	1800	194,397	10,071,875.27
550	1,989,548	101,930,323.00	1850	180,316	9,367,823.26
600	1,891,432	97,024,510.57	1900	166,235	8,663,768.70
650	1,793,316	92,118,698.13	1950	152,154	7,959,714.13
700	1,695,200	87,212,885.69	2000	138,073	7,255,659.57
750	1,597,083	82,307,073.26	2050	123,992	6,551,605.00
800	1,498,967	77,401,260.82	2100	109,910	5,847,538.86
850	1,400,851	72,495,448.38	2150	95,829	5,143,475.00
900	1,302,735	67,589,635.95	2200	81,748	4,439,425.00
950	1,204,618	62,683,814.86	2250	67,667	3,735,375.00
1000	1,114,659	57,981,925.00	2300	53,586	3,031,325.00
1050	1,028,112	53,569,275.00	2350	39,505	2,327,275.00
1100	941,566	49,241,950.00	2400	25,424	1,623,225.00
1150	855,020	44,914,650.00	2450	11,343	919,175.00
1200	768,473	40,587,325.00	2500	0	283,575.00
1250	681,927	36,260,000.00	**TOTAL**	**2,604,804,320.83**	

Looking at the picture of demand curve in Figure 4-1, we found that the remarkable differences of slope occurred at 2 areas. Change of slope happened at the point where the added cost hits 1,500 baht/visit since, at this cost point and the upper value, no demand of tourists in Zone 2, 3, 4, 5 and 6 were shown, only demand of tourists in Zone 1 appeared in the graph. In consideration of the slope of the entire demand curve, we found that demand in area 1, where the number of visit was between 0-278,884 visit/year, was steeper than demand in area 2, where the number of visit was between 278,884-3,282,539 visit/year.

In the case where added cost was higher than 1,500 bath/visit, we found that Zone 1 tourists still visited Bangsaen beach. This was due to the fact that travel cost of visiting Bangsaen beach was the lowest when compared to the other beaches known as a tourist attraction and also going to Bangsaen beach takes the shortest time. In addition, we found that Zone 1 tourists were showing personal preference and loyalty toward Bangsaen beach which explains their repeated visitation even when added cost changes. However, when the added cost hits 2,500 baht/visit, Zone 1 tourists will not visit Bangsaen beach any longer since its travel cost was too high when compared with the other beaches.

According to the results represented in Table 4-17, total areas under demand curve of traveling to Bangsaen beach was 2,604,804,320.83 units which was a value of consumer surplus toward Bangsaen beach itself. In other words, recreational use value of Bangsaen beach in the year of 2006 was 2,604,804,320.83 baht/year or was approximate 2,604.80 million baht/year.

4.2.2 Estimating recreational use value from the ITCM

Sampling group used in study ITCM was tourists of the same group that of study with ZTCM. Table 4-18 represented statistic related to the sampling group, it was found that tourists have average visit annually to Bangsaen beach was 2.39 times and total hour used during the visit in average 14.26 hours/visit besides an average travel cost was 2,778 baht/tourist/visit.

Most of travel cost that had happened wholly was expenditure such as food, souvenir and so on calculated to be 1,766.50 baht/tourist/visit or 63.89% of total travel costs while tourists had transportation cost only 712.50 baht/tourist/visit or calculated to be 25.65% of total travel costs.

In the case of considering of time cost, it was found that tourists had time cost equal to 299.00 baht/tourist/visit which was regarded that it was a little proportion compared with other costs or calculated to be only 10.76%.

Table 4-18 Visitors' travel statistics

Items	Mean Values
Visitation rate (times/year)	2.39
Time Cost (baht/tourist/visit)	299.00
Transportation Cost (baht/tourist/visit)	712.50
Expenditure (baht/tourist/visit)	1,766.50
Travel Cost (baht/tourist/visit)	2,778.00
Hours Usage for travel (hours/visit)	14.29

4.2.2.1 Trip Generation Function (TGF)

The trip generation function has visitation rate as the dependent variable. The independent variables as socioeconomic variables, hour usage for travel and travel cost (see Table 4-19). The relation between the dependent and independent variable show as follow;

$$V_i = f(TC_i, Hours_i, Sex_i, Education_i, Career_i, Income_i, Age_i) \quad \text{(-)} \quad \text{(+)} \quad \ldots (4\text{-}3)$$

Where;

V_i = visitation rate (number of visit per year) of tourist i

TC_i = travel cost (transportation cost + expenditure +time cost) of tourist i

$Hours_i$ = hour used during the visit of tourist i

Age_i = age of tourist i

Sex_i = sex of tourist i

$Education_i$ = education level of tourist i

$Career_i$ = career of tourist i

$Income_i$ = monthly income of tourist i

Table 4-19 Description of commonly used variables.

Individual characteristics	Description
Travel cost	A continuous variable increasing in baht.
Hour used during the visit	A continuous variable increasing in hours.
Age	A continuous variable increasing in years.
Sex (male)	Equals 1 if male, 0 is female.
Education level	A continuous variable increasing in studied years.
Career	
- government officer	
- merchant	
- student	Equals 1 if the visitor is to be the career, 0 if
- own business	otherwise.
- farmer	
- housewife	
- officer	
Income	A continuous variable increasing in baht.

From the trip generation function, it was able to find relationship between visitation rates (visits/year) and travel cost (baht/visit) by using Ordinary Least Square (OLS) in term of Multiple Linear Regression. Table 4-20 represented the results of this estimation.

Table 4-20 Multiple regression analysis result on relationship between independent variables and number of visit (visitation rate) to Bangsaen beach, Chonburi province

Variables	Coefficient (β)	t-stat	P-value*
Constant	4.098348	22.56763	0.0000
Travel Cost	-0.000899	-26.50294	0.0000
Hours	0.000590	0.111963	0.9109
Age	0.006835	2.383994	0.0176
Income	1.46×10^{-5}	0.475967	0.6344
Education	0.015327	1.710913	0.0879
Males	0.041609	0.796562	0.4262
Farmer	-0.178538	-0.898585	0.3694
Government Officer	-0.024709	-0.173285	0.8625
House Wife	-0.042284	-0.255930	0.7981
Merchant	-0.102436	-0.526803	0.5986
Officer	0.025369	0.192061	0.8478
Student	-0.131014	-0.991195	0.3222
Own business	0.107796	0.812676	0.4169
R-squared		0.768906	
Adjusted R-squared		0.761123	
Durbin-Watson stat		1.753485	

* Statistics was significance at 0.05.

Our estimation results showed that;

Travel cost had negative relation to dependent variable at the significant level of 0.05, this mean that when the travel cost changed 1 baht, number of visits would change 8.99×10^{-4} times/year in the opposite direction.

Age of tourists had a positive impact on the number of visit at significant level of 0.05. This means that if age of tourists changed 1 year, number of visits would change 6.835×10^{-3} times/year in the same direction.

Bangsaen beach is famous and popular beach among Thai tourist long time, therefore, the tourists visited to Bangsean beach who were in the middle-aged or in the working-aged group display a tendency to have a greater number of visits than the tourists who were the teenagers. There were many reasons for their frequent visitation to Bangsaen beach.

Firstly, the middle-aged group feels more familiar with the beach than the teenaged group does; they have good experience with the place so much that it gains their loyalties.

Secondly, traveling to Bangsaen beach was easy, safe, and convenient. The reason of the less frequent visits to Bangsaen beach among the teenaged group lies in the fact that this group prefers an adventurous, challenging, and exciting trip to a mild and peaceful style of tourism. Therefore, Bangsaen beach was not a perfect choice for them. However, since the behavior toward tourism of the group whose age was less than 15 years has not been studied, none of the relationship cannot be concluded herewith.

Another socioeconomic characteristic of tourists i.e. sex, education level, career, income and hour usage of travel are not a statistically significant variable, and this implies that hour used during the visit and socioeconomic characteristic are not prohibiting factor to visit Bangsaen beach.

According to this study, we found that sex, education level, career and income of tourists did not correlate to the number of visit to Bangsaen beach. The old perception of Bangsaen beach as the vacation place for low to middle class of people had changed.

Presently, Bangsaen beach is the tourist spot for people of every class. One thing to confirm this statement was that choices of accommodation at the beach ranged from the low priced to high priced hotel, luxurious one.

Furthermore, we found that the number of hour used during the visit at Bangsaen beach did not display any relationship with the number of visit. The tourists' purpose of visitation had been completely fulfilled at Bangsaen beach. It does not matter how long it takes to do the recreational activities at the beach. Since the tourists have a quality time spent at the beach, the number of visit found from the study does not drop.

4.2.2.2 Estimating Consumer Surplus from the ITCM

Estimating the consumer surplus per trip can be done by integrating under the demand curve for visits. TDRI and HIID (1995a) stated that it was simple to show that the consumer surplus per visit, assuming the linear relation between visitation and travel cost, was equal to;

$$CS_i = \frac{(\alpha + \beta p_i^{o} + \delta x_i + \varepsilon_i)^2}{-2\beta} = \frac{(N)^2}{-2\beta} \quad \ldots (4\text{-}4)$$

Where;

CS_i = consumer surplus of visitor i

$\overline{N}$ = average number of visits annually of sample groups

β = slope of the demand curve

Substituted $\overline{N}$ value which was 2.39 times from our sampling groups and Coefficient β was -0.000899 which shows the negative relation between travel cost and visitation rate in the equation 4-4. Based on our data and estimates, the consumer surplus for an average traveler was 3,176.92 baht annually. These estimates imply that the consumer surplus from Bangsaen beach visitors, which total about 1,168,082 persons/year (TAT, 2005), was 3,710,903,067.44 baht/year or was approximate 3,710.90 million baht/year (see Table 4-20).

4.2.3 Comparing use value from ZTCM and ITCM

Our finding, based on interviews with 400 sample groups employing the ZTCM and ITCM are as follow;

Table 4-21 Use value of Bangsaen beach, Chonburi province.

Method	Use Value of Bangsaen beach, Chonburi province		
	baht/visit	baht/tourists	Million baht/year
ZTCM	933.05	2,229.98	2,604.80
ITCM	1,329.26	3,176.92	3,710.90

The results were shown in Table 4-21 represented compared use values of Bangsaen beach from ZTCM and ITCM. The use values of Bangsaen beach calculated from ZTCM and ITCM were much different.

Use value received from ZTCM was approximate 2,604.80 million baht/year which had value lesser than that of receiving from ITCM which was approximate 3,710.90 million baht/year.

In the case of considering of visitation rate which was 2.39 times/year from our sampling groups and total number of tourists visited to Bangsaen which was equal to 1,168,082 person/year (TAT, 2005), it was found that use value received from ZTCM

was 933.05 baht/visit or calculated to be 2,229.98 baht/tourist. Besides, use value calculated from ITCM was 1,329.26 baht/visit or calculated to be 3,176.92 baht/tourist.

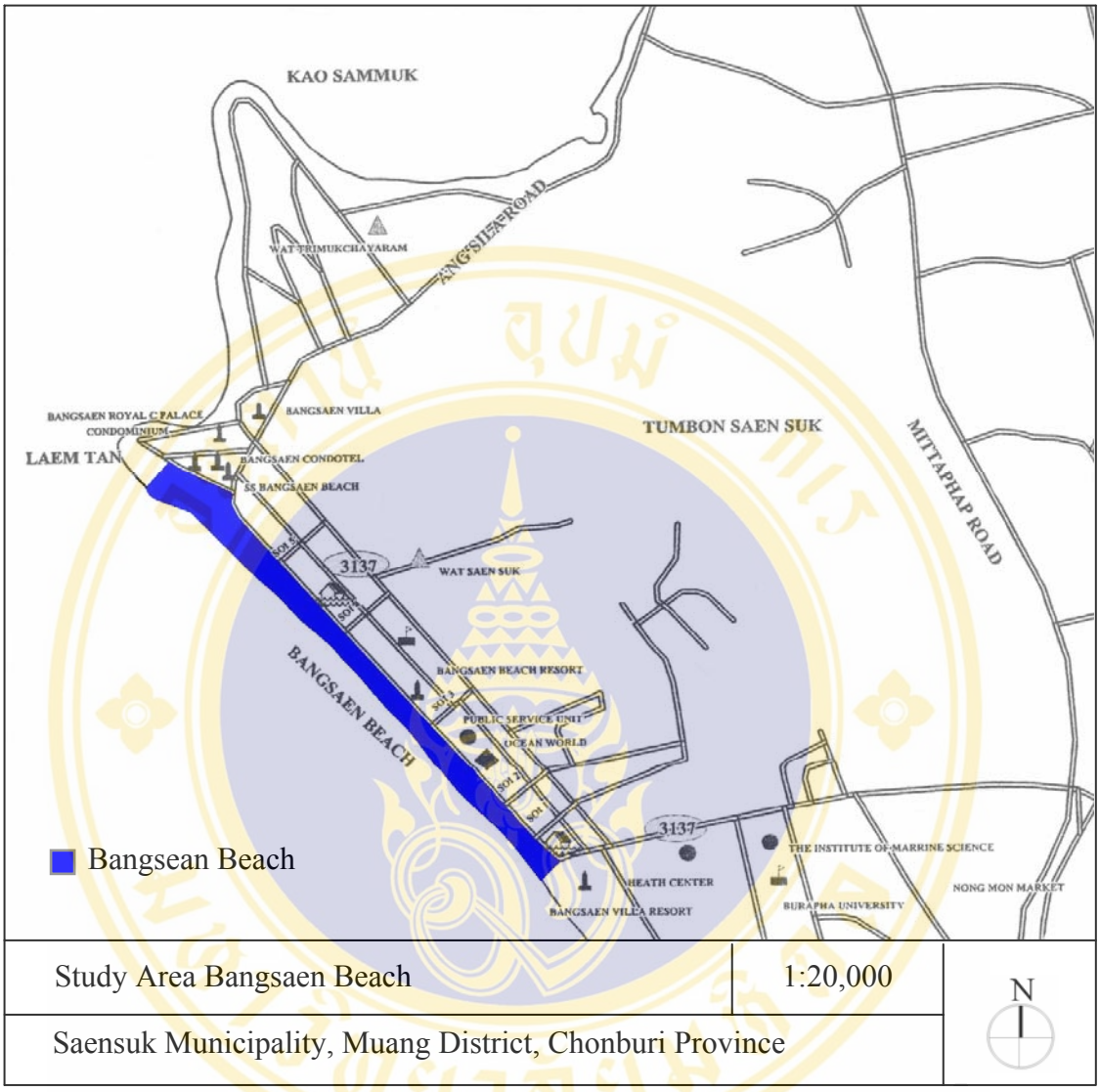
According to researches done in the past, we could not make a conclusion of which method of calculation will give us a greater use value. However, from this study, we found that the use value obtained from ZTCM was much less than those obtained from ITCM, which was contradictory to the study done by Willis and Garrod (1991) that studied by using ZTCM and ITCM in finding consumer surplus to forest where value of forest obtained from ZTCM was greater than those obtained from ITCM.

The difference of calculated values was caused by 2 reasons. First was the method of calculation we used. With regard to the ZTCM calculation, the tourists were segmented by zoning and the average value of each zone was then found out to use for calculation. Often times, the average value was less than a mean value which represents the actual figures of tourists. Therefore the value obtained from ZTCM was lower than that from ITCM. Second was the different method to define a set of zones surrounding Bangsaen beach may be effect the calculated values method by distance such as the number of zone was changed from 6 zones to 7 zones.

4.3 Recreational Carrying Capacity Assessment

4.3.1 Estimating beach density of Bangsaen beach, Chonburi province

From a survey conducted in the field part, it was found out that number of tourists on weekends was 9,100 persons were greater than that of weekdays which was 3,000 persons. Figure 4-3 was shown the study area Bangsaen beach, Chonburi province as total beach area of Bangsaen was 76 rai (TAT, 1997) said that, there were beach density calculated as 119.74 persons /rai on weekends and 39.47 persons /rai on weekdays. By the way, the weekends had more open period (hours) and average time of utilization (hours)/visit than that of weekdays as shown in Table 4-22.



Source: TAT (1997)

Figure 4-2 Study area Bangsaen beach, Chonburi province

Table 4-22 The characteristic of tourist's behavior

Period	No. of tourist (person/day)	Beach density (person/rai)	Area/Users (sq.ms/user)	Open Period (hrs)	Average time of utilization (hours)/visit
Weekday	3,000	39.47	40.53	9	5 hrs 30 min
Weekend	9,100	119.74	13.36	10	6 hrs 45 min

Namely, 40.50% of sampling groups on weekdays could be acceptable if number of tourists were increased 3 times of number of tourists surrounding or calculated as beach density would equal to be 118.42 persons/rai while there were only 1.50% of sampling group that allowed tourists to be increased 5 times or calculated as beach density would equal to be 118.42 persons/rai, while sampling group on weekends in amount of 94.50% were satisfied with number of tourists present having number of tourists equal to 119.74 persons/rai. There was only 5.50% that allowed have tourists to be increased in 2 times or calculated as beach density would equal to be 239.47 persons/rai. The results were shown in Table 4-23.

Table 4-23 The crowded perception of visitor of Bangsaen beach

Period	No. of Encounter (x total tourists)	Beach Density (persons/Rai)	Statistic		Percentage (%)
			Mean	Median	
Weekday	1	39.47	87.83	78.95	27.50
	2	78.95			28.00
	3	118.42			40.50
	4	157.89			2.50
	5	197.37			1.50
Weekend	1	119.74	126.03	119.74	94.50
	2	239.47			5.50

Therefore, it may be able to conclude tourists' requirement by using mean value in each period of time, namely, the weekdays 87.83 persons/rai and the weekends 126.03 persons/rai to be maximum tourists' requirements and median value of each period of time, namely, the weekdays 78.95 persons/rai and the weekends 119.74 persons/rai as optimum tourists' requirements.

When results were brought to compare with calculation from standard, tourists' requirements on weekdays would be arranged in Resort (comfort) and tourists' requirements on weekends would be arranged in Resort (medium standard) or Public beach (high standard) (more detail in Lowson and Band-Bovy, 1977).

From standard value of using beach area that established beach density value to be maximums that should not exceed 400 persons/rai (Lowson and Band-Bovy, 1977), when compared with beach density of Bangsaen beach, it was found that there was still a density of tourists in a low criterion, namely, it was 39.47 persons on weekdays and 119.74 persons on weekends.

4.3.2 Estimating PCC of Bangsaen beach in each period of time

Physical Carrying Capacity (PCC) is the maximum number of users that can physically fit into or onto the site, over a particular time. They could be assessed as follow;

$$\mathbf{PCC} = \frac{\mathbf{A \times Rf}}{\mathbf{a}} \quad \ldots(4\text{-}5)$$

Where;

A = Available area for public use

Rf = Rotation factor (number of visit per day)

Rf = Open period / (Average time of utilization/ visit)

a = area required per user

According to equation 4-5, this study can be calculated the PCC in each period of time, the results were shown as follow;

In case of period of weekdays, substituted 'A' value which was 121,600 square meters, 'a' value was 18.22 square meters /person as maximum PCC and 20.27 square meters/person as optimum PCC. And then, calculated 'Rf' value by multiply open period was equal to 9 hours by average time of utilization/visit was 5 hours 30 minute.

In case of period of weekends, substituted 'A' value which was 121,600 square-meters, 'a' value was 12.70 square-meters /person as maximum PCC and 13.36 square-meters /person as optimum PCC. And then, calculated 'Rf' value by multiply open period was equal to 10 hours by average time of utilization/visit was 6 hours 45 minute. Table 4-24 was shown the result of PCC estimation.

Table 4-24 Estimating of PCC of Bangsaen beach in each period.

Period		Available area for public uses (sq.m) : A	Area required per user (sq.m/user) : a	Rotation factor : Rf	PCC (users/day)
Weekday	Maximum	121,600	18.22	1.64	10,947
	Optimum		20.27	1.64	9,840
Weekend	Maximum	121,600	12.70	1.48	14,176
	Optimum		13.36	1.48	13,468

Table 4-24 was shown that during weekdays, maximum PCC of Bangsaen beach was 10,947 persons/day and optimum PCC was 9,840 persons/ day while during weekends, maximum PCC of Bangsaen beach was 14,176 persons/day and optimum PCC was 13,468 persons/ day.

In the case of considering number of tourists averagely per day comparing with PCC obtained from calculation, it was found that number of tourists on weekdays and weekends still did not exceed PCC. Namely, the weekdays, there were 3,000 tourists

averagely which there was PCC equal to 9,480 persons which was shown that in such the weekdays Bangsaen beach was able to accommodate tourists increasingly up to 9,840 persons/day by not to make it exceeded PCC

While there were tourists averagely on weekends in number of 9,100 persons /day. But, it was found that in such a period of time Bangsaen beach was still able to accommodate tourists up to 13,468 persons /day.

According to the PCC during weekdays was lower than PCC during the weekends. It can be explained by the fact that the tourists coming to Bangsaan during weekdays prefer peaceful environment for their vacation to busy and congested atmosphere, thus, larger area to do recreational activities was needed. The tourists who visit Bangsaan beach during weekends like busy and bustling style of vacation, thus, large space was not their priority. The difference of preferential factors leads to different value of PCC derived from the calculation in the different period of time.

CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

Beaches are highly valuable tourist resources, therefore determining their value in term of money and their carrying capacity are an essential factor for their sensible use and management. The study synthetically presented in this paper was focused on Bangsean beach, Chonburi province where famous and popular among Thai tourists for long time during December 2005-February 2006.

The objective of this study was to evaluate use value and estimate physical carrying capacity of Bangsaen beach. The two distinct methods of valuation, Zonal Travel Cost Method (TCM) and Individual Travel Cost Method (ITCM) were used in this study, besides, measurement on beach density and crowding perception were used for the physical carrying capacity evaluation. The researcher also studied about factors which affected value of Bangsaen beach by choosing to study 400 Thai tourists who visited to Bangsaen beach. The researcher could discuss the study result as follows;

5.1 Recreational Valuation of Bangsaen Beach, Chonburi Province

Recreation is the most direct and concrete benefits of the beach. The TCM is a commonly used method to value recreational demand. It is based on the premise that tourists are rational i.e. their expected utility from the trip should be at least equal to the travel cost and the opportunity cost of their time. In an effort to value the recreational benefits provided by Bangsaen beach, Chonburi province, the researcher gathered information on the traveling costs and hour usage for traveling in term of individual sampled and zonal. These data were useful to formulate a Trip Generation Function (TGF), from which the consumer surplus associated with each trip made to Bangsaen beach would be estimated.

In the case of considering of the trip generation function by using Ordinary Least Square (OLS) to find relationship between visitation rate (visit/year) and travel cost (baht/visit). Both of ZTCM and ITCM, it was found that travel cost had negative relation to visitation rate at the significant level of 0.05. This means that when travel cost changed the visitation rate or number of visits would change in the opposite direction.

Using ZTCM and ITCM which provided an estimate of direct benefits to beach tourists, it was found that use value of Bangsaen beach calculated from ZTCM and ITCM were much different. The use value received from ZTCM was approximate 2,608.80 million baht/year (838.34 baht/visit or 2,406.08 baht/tourists) which had value lesser than that of receiving from ITCM which was approximate 3,710.90 million baht/year (1,106.94 baht/visit or 3,176.92 baht/tourists).

5.2 Tourist's Behaviors and Various Tourism Factors Associated with Use Value of Bangsaen Beach, Chonburi Province

As expected of multiple analysis results from ITCM, the visitation rate was influence by travel cost, socioeconomic characteristic of tourists and hour usage for traveling to Bangsaen beach. Unfortunately it was found that only two variables had relation to visitation rate at the significant level of 0.05, namely, travel cost and age of tourists. Age of tourists was positive impact on the visitation rate this means that if the age of tourists was increased the visitation rate would also increase.

Another socioeconomic characteristic of tourists i.e. sex, education, career, income and hour usage of travel were not a statistically significant variable, and this implies that hour usage for travel and socioeconomic characteristic were not prohibiting factor to visit Bangsaen beach.

5.3 An Assessment of Physical Carrying Capacity of Bangsaen Beach, Chonburi province

In order to study and evaluate PCC, this study divided period of studied time into 2 periods, namely, a period of weekdays and a period of weekends.

The result of this study clearly showed how the Bangsaen beach was being utilized during weekdays and weekends and the difference in the PCC figures obtained, with regards to the number of tourists visited to Bangsaen beach, tourists' behavior pattern, tourists' level of satisfaction pertaining to the increased number of tourists as called crowding perception. The only one factor which remains unchanged throughout the period was the recreational area, as in this study was 76 rai or 121,600 squared meters.

The study results shown that, the PCC calculated figure on weekdays, optimum PCC was 9,840 tourists /day, which was less than the optimum PCC of 13,468 tourists /day during the weekends. While the maximum PCC of 10,947 tourists /day during the weekdays less than the maximum PCC on weekend which was 14,176 tourists /day. The PCC calculation takes into account the physical aspect of the Bangsaen beach area including the requirements of tourists. It was obvious that during the weekdays, tourists' requirement for Resort (comfort) type area was higher than Resort (medium standard) or Public beach (high standard) utilization during the weekends. Variation in tourists' demand and utilization characteristics of beach area for a particular period was factors which caused variation in the PCC obtained during a particular period.

With the number of tourists visited to Bangsaen beach was 1,168,082 persons /year or calculated to be 3,000 persons /day averagely on weekdays and 9,100 persons /day averagely on weekends. It was found that number of tourists on weekdays and weekends still did not exceed PCC.

Statistics complied over the past 10 years (TAT, 2002) showed that the number of tourists visited to Bangsaen beach had grown by 1.46% a year. Hence, the number of tourists in the next 10 years should be around 1.38 million tourists a year which close to the number of tourists today. Over the next 10 year by 1.46% annual growth, the number of tourists on weekdays would increased from 3,000 tourists/day to be 3,467 tourists /day and the number of tourists on weekends would increased from 9,100 tourists/day to be 10,519 tourists/day. Therefore, the number of tourists during the weekdays and weekends during that time should be in the PCC.

5.4 Recommendations

5.4.1 Recommendations for Policy Implementation

1. From the study, we found that the tourists going to Bangsaen beach visited other tourist destination situated on the same route, such as Nongmon Market, Sammuk Hill and Angsila. Thus, development and improvement of those places and other neighboring sites, for example arranging inter-connected routes among the destinations, co-promoting the festivals or special events, and etc., is likely to increase traffic of tourists to Bangsaen as a whole.

2. The calculated use value of Bangsaen beach obtained from the 2 method, ZTCM and ITCM, was between 2,604.80 – 3,710.90 million baht a year. Therefore, the government can use that use value to serve as a management tool for Bangsaen beach, i.e. use to allocate tourism budget for the beach area. The use value of Bangsaen beach also serve as guideline cost figure for comparison the state's investments in other areas such as industrial sector. This should be useful to future management/ investment planning for the beach area.

3. Based on the tourism situation of Bangsaen beach today, it is not yet necessary to use price mechanism to control the rise in the number of tourists because the beach can still accommodate tourists at the level not exceeding the PCC. When considering the 1.46% annual growth in the number of tourists, the number of tourists

during the weekends in the next 10 years would reach 10,519 persons a day – close to the PCC. Hence, for that period, it is necessary to adopt measure to monitor the situation and develop plans to accommodate the increasing number of tourists. Price mechanism such as beach entrance fee may be used to curb the rise in the number of tourists. However, a feasibility study must be conducted prior to the imposing a fee for the use of a public beach which has always been free to the public, unlike national parks.

5.4.2 Recommendations for Further Study

1. The different method to define a set of zone surrounding the sites should be studied. Because this may be effect the calculated use value of the sites.

2. Due to the time limitation, this study was executed for just the period of December to February of the consecutive year, thus, generating a result which did not completely reflect the actual situation. It is highly recommended to any successive researchers to conduct a research covering a whole year period in order to eliminate seasonal factors.

3. Apart from Bangsaen beach, Chonburi province, TCM can be used to calculate a use value of other natural sites such as the national parks, public parks, beaches in other provinces, and etc. The further study is strongly recommended to be done together with a study of PCC for the benefits in the overall management.

4. The further study should increase the study by using other economic methods to evaluate environmental value such as Contingent Valuation Method (CVM) so that can compare the obtained result with this study.

5. Evaluation of recreational carrying capacity of Bangsaen beach in this study focused on only physical carrying capacity, it might not complete the overall picture due to lack of social carrying capacity, biological carrying capacity and facility

carrying capacity. Therefore, further study should include all type of carrying capacities.

6. Furthermore, the distribution of tourists visiting Bangsaen beach should be studied in greater details since, in a rough picture, the population of tourists is more concentrated at one area than another, meaning the management of resources required to support tourism might not correspond with the actual needs. Although the overall number of tourists at the beach is presently not exceeding the PCC, further study on Bangsaen beach by dividing it into segments and focusing on tourist distribution will have a positive impact on tourism and resources management for the beach such as build up more facilities or beach activities in order to distributed the number of tourists in the higher density to lower density zone.

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APPENDIX

APPENDIX A

Valuation Researches in Thailand

Table A-1 Valuation researches in Thailand

No.	Researchers	Method and Study Area	Results
1	Eutrirak (1981)	ZTCM to estimate use value and CVM to estimate use and non-use value of Lumpinee Park (area 360 rai).	Use value from ZTCM in 1980 is 13.2 MB and from CVM is 13.0 MB. Non-use value in 1980 is 116.6 MB.
2	TDRI and HIID (1995a)	ITCM to estimate use value and CVM to estimate non-use value of Khao Yai National Park (area 1,355,397 rai).	Use value is 1,420 baht/visit of which 870 baht is the consumer surplus. Non-use value for visitors is 730 baht/person/year and for non-visitors is 183 baht/person/year. WTP for entrance fee of Thai visitors is 22 baht/person/visit and for foreign visitors is between 50-125 baht/person/visit. Total economic value to Thai visitors and non-visitors is 3,080 MB/year.
3	TDRI and HIID (1995b)	CVM (Bidding Game) to estimate WTP for wastewater treatment in Phuket.	Average WTP is 2.08 baht/cubic meter of 79 baht/month which is below the actual cost of wastewater.

Table A-1 Valuation researches in Thailand (cont.)

No.	Researchers	Method and Study Area	Results
			Treatment of 7 baht/cubic meter.
4	Panyawadee et al (1998)	CVM to estimate farmers' WTP for used of Mae Thang Irrigation, Chiang Mai province.	Mean WTP is 61 baht/rai/year and Median WTP is 520 baht/rai/year or 0.142-0.172 baht/cubic meter.
5	Isarangkura (1998)	Contingent Ranking Method and CVM to determine the entrance fee of 3 recreational areas in Chiang Mai Province.	The proposed entrance fee for Doi Inthanon National Park is 40 baht/person/visit and 20 baht/person/visit for Mae Sa Waterfall. No entrance fee should be collected for Doi Suthep.
6	DOF and KU (1998)	Market valuation and CVM to estimate use value and non-use value of Huay Ka Kang (area 1.7 million rai).	Direct use value and non-use value is 9 MB/year. Use value is 38 MB/year, non-use value is 28,383 MB/year. Total economic value is 28,430 MB/year.
7	Sathairathai (1998)	Valuation of mangroves in Surat Thani (areas 2,500 rai). Direct use value is estimated by Market Valuation, indirect value in terms of fishery production by Production Function and use value of coastline protection	Direct use value is 562.6 baht/rai, indirect use value is term of off-shore fishery vary from 133.19 to 440.93 baht/rai depending on price elasticity of demand. Use value of coastline protection is 12,444.33 baht/rai, the

Table A-1 Valuation researches in Thailand (cont.)

No.	Researchers	Method and Study Area	Results
		by Cost Replacement Approach.	total economic values are 13,139.68-13,447.42 baht/rai depending on price elasticity of demand.
8	Isarangkura and Khawsaard (1997)	Benefit transfer to estimate non-use value of Kang Sear Ten (areas 45.6 square meter).	Non-use value in 1997 is 900 MB.
9	Sribenchapalang-kul (1986)	ZTCM to estimate recreational use value of Dusit Zoo (areas 118 rai).	Use value in 1985 is 27.96 MB, use value in the next 25 year are 204.52-298.42 MB.
10	Changsarn (1992)	ZTCM to estimate recreational use value of Rama Park Ayutthaya Province.	Use value in 1990 is 6.43 MB.
11	Ngernvichit (1998)	CVM (Bidding Game) to determine WTP for wastewater treatment in Rama IX Swamp.	Average WTP is 45 baht/capita/month.
12	Trakannuwatkul (1995)	Dose Response Approach to estimate air pollution related health costs of Bangkok people. Health costs include treatment and transportation costs and loss of earning.	Total economic health costs are approx 2,102 MB in 1991 comprising of direct health care costs that is based on treatment costs and transportation costs of 1,773 MB and indirect health costs based on loss of earning of 229 MB.

Table A-1 Valuation researches in Thailand (cont.)

No.	Researchers	Method and Study Area	Results
13	Suanjai (1990)	CVM to determine WTP of wastewater treatment in Jomtein Community.	Average WTP is 107 baht/month.
14	Loypa (1989)	ZTCM and CVM to estimate use value of Patthalung, Songkla and Nakhon-Srithummarat Province (areas 285,625 rai).	Use value from TCM and CVM in 1987 is 11.07 and 3.30 MB respectively, use value in the next 25 year from TCM are 83.91 and 126.19 MB, from CVM are 25.01 to 37.62 MB.
15	Yamyoo (1996)	ZTCM and CVM to estimate use value of Park, Bangkok (area 29 rai).	Use value in 1995 is 13.07 MB or approx 450,000 baht/rai.
16	Limprayoon (1994)	ZTCM and CVM to estimate recreational value (use value, option value and existence value) of Samed Island, Rayong Province (areas 3,125 rai).	Recreational value from ZTCM and CVM are 27.15 to 23.06 MB/year respectively, option value is 108.53 MB/year and existence value is 3,604.86 MB/year. Total economic value is 3,738.88 MB/year.
17	Chinpong (1989)	ZTCM and CVM to estimate use value of Jartujak Park, Bangkok (areas 190 rai)	Use value in 1987 is 52.56 MB and use value in the next 25 year are 560.82 to 385.27 MB.
18	Supphatchai (1996)	CVM to estimate WTP for the Mahanag and San Sab Canals Clean-Up Project.	Average WTP is 360 baht/person/year.

Table A-1 Valuation researches in Thailand (cont.)

No.	Researchers	Method and Study Area	Results
19	Wattanaputee (1996)	Replacement Cost Approach to estimate the loss of economic value in the Chaopraya Basin in 1994.	The loss of economic value is 2,973 MB.

APPENDIX B

แบบสอบถามสำหรับนักท่องเที่ยวบนหาดบางแสน จังหวัดชลบุรี

หมายเลขที่.....

วิทยานิพนธ์

เรื่อง

การประเมินมูลค่าและขีดความสามารถในการรองรับการท่องเที่ยวของหาดบางแสน จังหวัดชลบุรี

แบบสอบถามนี้เป็นส่วนหนึ่งของงานวิจัยวิทยานิพนธ์ คณะสิ่งแวดล้อมและทรัยพากรศาสตร์ มหาวิทยาลัยมหิดล ขอความกรุณาท่านช่วยตอบคำถาม ข้อมูลของท่านมีความสำคัญอย่างยิ่งต่อการวิจัยครั้งนี้ และข้อมูลของท่านทางผู้วิจัยจะถือว่าเป็นความลับ ขอขอบคุณที่ให้ความร่วมมือ

ผู้สัมภาษณ์.....วันสัมภาษณ์.....

สถานที่สัมภาษณ์.....เวลา.....

ข้อสังเกต

.....

.....

.....

<u>ส่วนที่ 1</u> ลักษณะทางเศรษฐกิจสังคม

1. อายุ.....ปี
2. เพศ 1(...) ชาย 2(…) หญิง
3. ปัจจุบันท่านพักอาศัยอยู่ที่ อำเภอ.....จังหวัด.....
4. ระดับการศึกษาขั้นสุดท้าย (จบการศึกษาแล้ว)

   1(...) ไม่ได้เรียน- เรียนไม่จบ ป.4 4(...) อนุปริญญา/อาชีวศึกษา/ประกาศนียบัตร

   2(...) ประถมศึกษา 5(...) ปริญญาตรี หรือ สูงกว่า

   3(...) มัธยมศึกษา 6(...) อื่น ๆ (ระบุ.....)
5. ปัจจุบันท่านประกอบอาชีพใด

   ตำแหน่ง/หน้าที่ (เช่น สถาปนิก วิศวกร ค้าขาย).....
6. ปัจจุบันท่านมีรายได้เฉลี่ยต่อเดือนอยู่ในกลุ่มใด (กรณีนักเรียน/นักศึกษาให้ถามเป็นรายรับ)

   1(...) ต่ำกว่า 10,000 บาท 4 (...) 30,001 – 40,000 บาท

   2(...) 10,001 – 20,000 บาท 5 (...) 40,001 – 50,000 บาท

   3(...) 20,001 – 30,000 บาท 6 (...) 50,001 บาทขึ้นไป

<u>ส่วนที่ 2</u> ลักษณะการมาท่องเที่ยวบนหาดบางแสน

1. การมาเที่ยวหาดบางแสนของท่านในครั้งนี้นับเป็นครั้งที่เท่าไหร่.....ครั้ง (นับรวมครั้งนี้ด้วย)
2. ในช่วง 1 ปีที่ผ่านมานี้ ท่านมาเที่ยวที่หาดบางแสนกี่ครั้ง.....ครั้ง (นับรวมครั้งนี้ด้วย)
3. อะไรเป็นสิ่งดึงดูดที่สำคัญของหาดบางแสน ที่ทำให้ท่านมาเที่ยวในครั้งนี้

   (**<u>ห้ามบอกตัวเลือกให้ผู้ให้สัมภาษณ์ทราบก่อน</u>** ให้ผู้ให้สัมภาษณ์ตอบได้มากกว่า 1 ข้อ)

   1(...) อยู่ใกล้กรุงเทพ เดินทางสะดวก 4(...) มีที่พักสะดวกสบาย

   2(...) ค่าใช้จ่ายไม่แพง 5(...) อื่น ๆ (ระบุ.....)

   3(...) มีธรรมชาติที่สวยงาม
4. การมาเที่ยวหาดบางแสนครั้งนี้ ท่านเดินทางมาอย่างไร

   1(...) รถยนต์ส่วนตัว 3(...) รถประจำทางสาธารณะ

   2(...) รถเช่า
5. การมาเที่ยวหาดบางแสนครั้งนี้ ท่านคิดว่าต้องเสียค่าใช้จ่ายทั้งหมด ดังรายการต่อไปนี้ เป็นจำนวนเงินประมาณเท่าไหร่

   ค่าเดินทาง

   ค่ารถโดยสาร..... บาท ค่าเช่ารถ.....บาท ค่าน้ำมันรถ.....บาท

ค่าอาหาร/เครื่องดื่ม.....บาท ค่าที่พัก.....บาท

ค่าของที่ระลึก.....บาท ค่าเช่าอุปกรณ์.....บาท

ท่านต้องเสียค่าใช้จ่ายอื่น ๆ อีกหรือไม่ (ระบุ).....

จำนวนเงิน.....บาท **ค่าใช้จ่ายรวมทั้งหมดไป-กลับ.....บาท**

หมายเหตุ *ในกรณีที่ผู้ให้สัมภาษณ์ไม่เสียค่าใช้จ่าย ให้ถามถึงสาเหตุ เช่น เป็นสวัสดิการของบริษัท หรือได้รับรางวัล เป็นต้น*

6. การมาเที่ยวหาดบางแสนในครั้งนี้ เท่าเดินทางมากับใครบ้าง

   1(...) มาคนเดียว 2(...) มากับครอบครัวหรือญาติพี่น้อง รวม.....คน

7. การมาเที่ยวในครั้งนี้ ท่านพักค้างคืนที่หาดบางแสนหรือไม่

   1(...) พักค้างคืน เป็นเวลา.....วัน 2(...) ไม่พักค้างคืน

8. การมาเที่ยวหาดบางแสนในครั้งนี้ ท่านมาทำกิจกรรมอะไรบ้าง

   1(...) เล่นน้ำ 5(...) ชมวิว

   2(...) เดินเล่น 6(...) นอนพักผ่อน

   3(...) เล่นสกู๊ตเตอร์ 7(...) อื่น ๆ

9. การเดินทางมาเที่ยวในครั้งนี้ นอกจากที่หาดบางแสนแล้ว ท่านได้แวะ/จะไปแวะเที่ยวที่ใดก่อนเดินทางกลับหรือไม่

   1(...) แวะเที่ยว ที่..... / จะแวะเที่ยว ที่.....

   2(...) ไม่แวะ

<u>ส่วนที่ 3</u> ขีดความสามารถในการรองรับการท่องเที่ยวของหาดบางแสน

ให้ผู้สัมภาษณ์ สอบถามนักท่องเที่ยวถึงสภาพผู้คนบนชายหาดในขณะสำรวจ และทดสอบให้นักท่องเที่ยวประเมินปริมาณผู้คนสูงสุดบนชายหาด ที่จะก่อให้เกิดความไม่พึงพอใจต่อสภาพแวดล้อมของหาด

10. จากจำนวนนักท่องเที่ยวในขณะสัมภาษณ์ หากมีการเพิ่มจำนวนนักท่องเที่ยวขึ้นอีก โดยเพิ่มครั้งละ 1 เท่าของจำนวนนักท่องเที่ยวขณะสัมภาษณ์ ท่านคิดว่า จำนวนนักท่องเที่ยวที่เพิ่มขึ้นจำนวนเท่าใดที่ทำให้ท่านเกิดความรู้สึกไม่พึงพอใจต่อสภาพแวดล้อมของหาดบางแสน

    1(...) ไม่ต้องการให้มีเพิ่มขึ้นอีก 4(...) 4 เท่า

    2(...) 2 เท่า 5(...) 5 เท่า

    3(...) 3 เท่า

BIOGRAPHY

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