

CHAPTER III

RESEARCH METHODOLOGY

The methodology of this study can be divided into 4 main tasks as follows:

- Task 3.1 Data Collection
- Task 3.2 Questionnaire Design
- Task 3.3 Factory Survey
- Task 3.4 Data Analysis

3.1 Data Collection

Previous relevant studies and survey reports were collected and reviewed. The resources of data were available from i.e., Department of Industrial Work (DIW) reports/studies, The Oil Palm Research Center (OPRC) of Prince of Songkla University (PSU), Thai Environmental Institute (TEI) studies, Thai Research Fund (TRF) studies, research thesis, the financial institutes such as; Siam Commercial Bank (SCB) Research Institute, Research Department of Bangkok Bank Public Company Limited, and stock market.

From collected data, there are about 20 factories that employing wet process, the factories in the scope of this study. A list of wet process palm oil mills in Thailand is as shown in *Table 3.1*.

Table 3.1 List of Wet Process Palm Oil Mills in Thailand

No.	Factories Name	Production Capacity (ton/hr)
	Krabi Province	
1	Univanich Palm Oil (Aoluk)	30
2	Univanich Palm Oil (Plaiphraya)	60
3	Asian Palm Oil	45

Table 3.1 List of Wet Process Palm Oil Mills in Thailand (cont.)

No.	Factories Name	Production Capacity (ton/hr)
4	United Palm Oil	50
5	Srijaroen Palm Oil	50
6	Siam Modern Palm	45
	Surat Thani Province	
7	Southern Palm (2521)	45
8	Southern Palm Oil Industry (1993)	60
9	Thai Tallow and Oil	45
10	Unipalm Industry	45
11	SPO-Agro	45
	Satun Province	
12	Thai Development Palm	25
	Trung Province	
13	Abico Holding *	24
14	Trung Palm Oil	25
15	Otago	45
	Chumporn Province	
16	Chumporn Palm Oil Industry	55
17	Vichitphan Palm Oil	45
18	Sawee Palm Oil Industry	45
19	Tung Tong Palm Oil	30
	Songkhla Province	
20	Pure Plant Oil	20

Note: * Lumsoon (Thailand) has taken over the Abico Holding Company and changed the company name as Lumsoon (Thailand).

Source: Department of Inland Trade, Ministry of Commerce and updated by factory surveys.

3.2 Questionnaire Design

Questionnaire is a major tool of this study for collecting actual data from industry. To design an appropriate questionnaire, the collected data were used and extracted for an outline. The questionnaire is divided into 5 parts as below:

- Part 1 General Information
- Part 2 Production Process Data
- Part 3 Economic Performance Data
- Part 4 Waste Management Data
- Part 5 Environmental Policy Data

The designed questionnaire is shown in *Appendix B*. The questionnaires were sent to all 20 palm oil mill factories via mail and for a primary data collection prior to the field surveys. An onsite pretest of the questionnaire had also conducted on 5 factories to obtain a broader idea about the palm oil mill industry. Before the actual factories surveys and interviews, the questionnaire was improved and corrected.

3.3 Factory Survey

From sending the questionnaires via mails, the responses from factories allowed only 15 factories possible for field surveys and interviews. However, the field surveys had covered Krabi, Surattani, Satun, Trung, and Songkla provinces in the southern region of Thailand. 15 factories out of 20 wet process palm oil mill factories were surveyed during May 9, 2002 to June 29, 2002. A list of surveyed factories is shown in *Table 3.2*.

Table 3.2 List of Surveyed Palm Oil Mills Factories

No.	Factories Name	Production Capacity (ton/hr)
Krabi Province		
1	Univanich Palm Oil (Aoluk)	30
2	Univanich Palm Oil (Plaiphraya)	60
3	Asian Palm Oil	45
4	United Palm Oil	50
5	Srijaroen Palm Oil	50
6	Siam Modern Palm	45
Surat Thani Province		
7	Southern Palm (2521)	45
8	Southern Palm Oil Industry (1993)	60
9	Thai Tallow and Oil	45
10	SPO-Agro	45
Satun Province		
11	Thai Development Palm	25
Trung Province		
12	Lumsoon (Thailand)	45
13	Trung Palm Oil	25
14	Otago	45
Songkhla Province		
15	Pure Plant Oil	20

By reason of an accuracy of information and industrial response study on the emission charge scheme, the field surveys and interviews were directed to the policy maker level of the factories such as managing directors, executive directors, factory managers, financial department manager and/or factory engineers.

In addition to the onsite factory surveys and interviews, the conversations via telephone and fax were conducted for supplementary details or insufficient data.

3.4 Data Analysis

To study the impact of emission charge scheme, it need to evaluate based on an up-to-date data and should cover one calendar year. Due to the factory surveys had conducted on the first haft year 2002, thus, the economic analysis are based on year 2001 information such as raw material consumption, production capacity, oil extraction efficiency, BOD load, actual sale, production cost, and emission charge. The analysis are divided into 2 parts:

1. Impacts of EC on palm oil mill factories with reference to their economic performance

- EC per profit
- EC per ton of product

The analysis are divided in to 2 case:

- With AFTA obligation implementation
- Without AFTA obligation implementation

2. The relationship of the willingness to pay (Baht of EC per ton of product) of industry under the emission charge and their;

- profit
- production capacity
- level of policy maker's education
- existing treatment level
- existing wastewater management or application of their treated wastewater
- environmental policy of the palm oil mill industry