

**JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
THAILAND OFFICE**

**BUREAU OF LOCAL ADMINISTRATIVE DEVELOPMENT
DEPARTMENT OF LOCAL ADMINISTRATION (DLA)
MINISTRY OF INTERIOR**

***THE STUDY FOR
THE DEVELOPMENT OF
WASTE MANAGEMENT SYSTEMS
IN LOCAL AREAS IN
THE KINGDOM OF THAILAND***

FINAL REPORT

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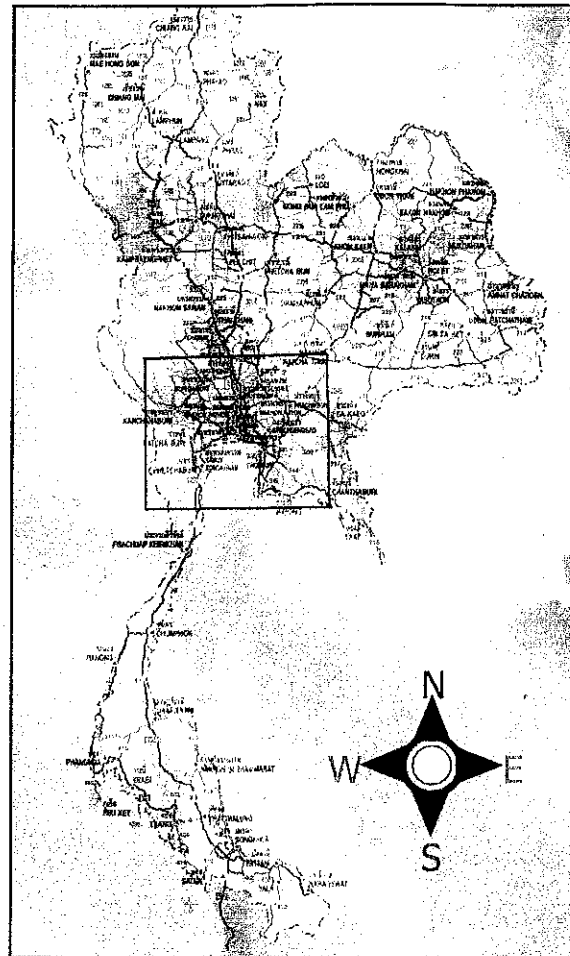
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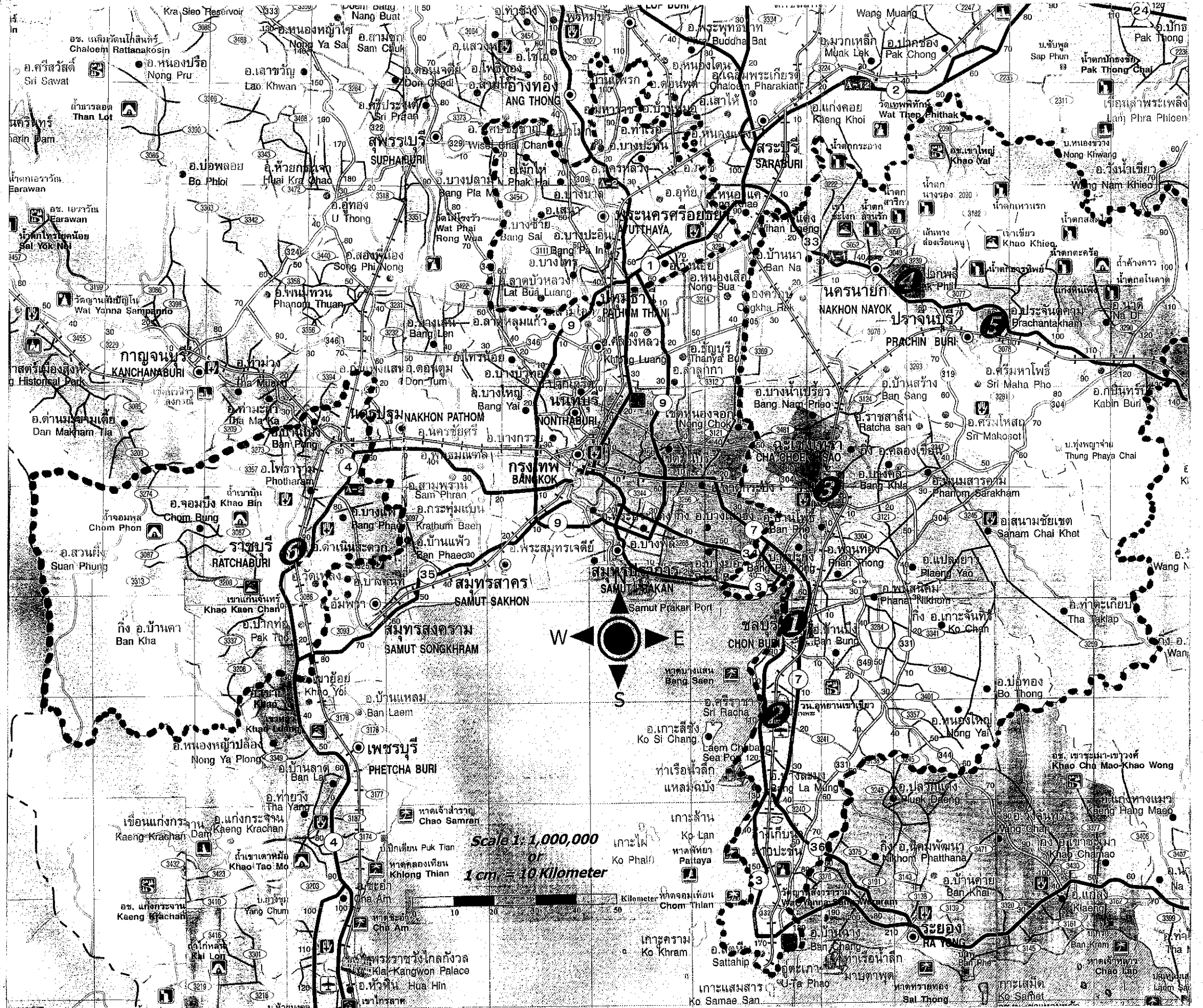
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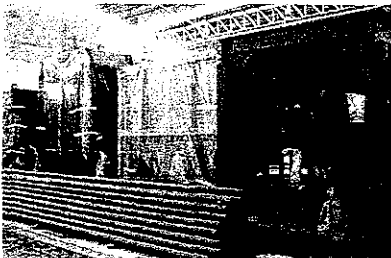
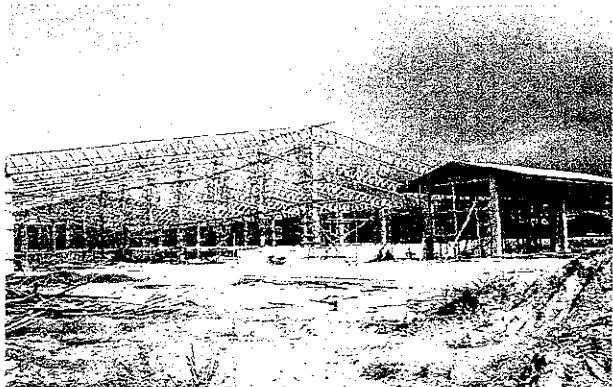
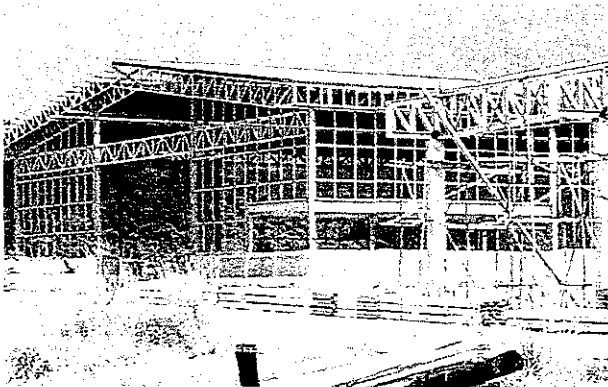
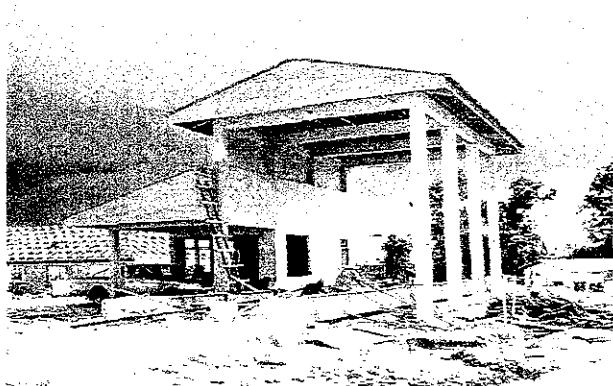
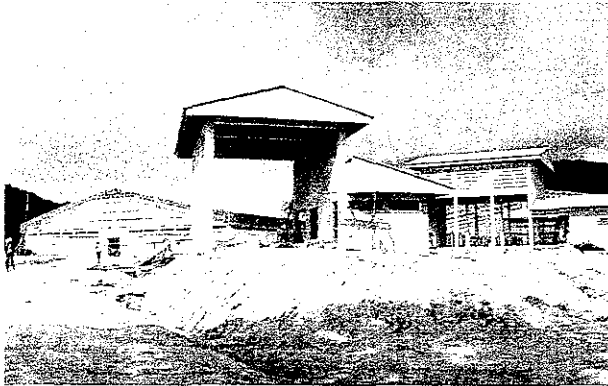
▲ Map of Thailand

List of Local Administrations to be Studied

- Cholburi Provincial Administration Organization Cholburi Province** ①
- Sriracha Town Municipality Cholburi Province** ②
- Chachoengsao Town Municipality Chachoengsao Province** ③
- Koh Wai Sub-district Municipality Nakhonnayok Province** ④
- Prachantakam Sub-district Municipality Prachinburi Province** ⑤
- Ratchaburi Town Municipality Ratchaburi Province** ⑥



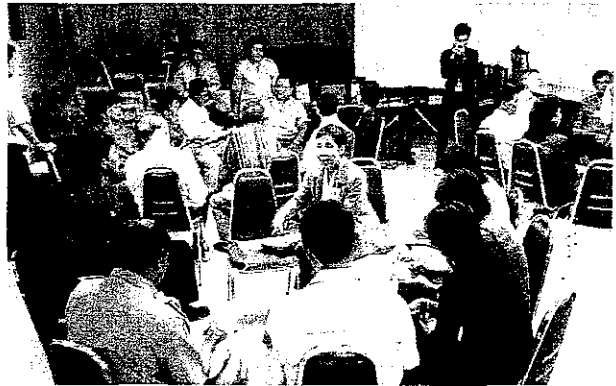
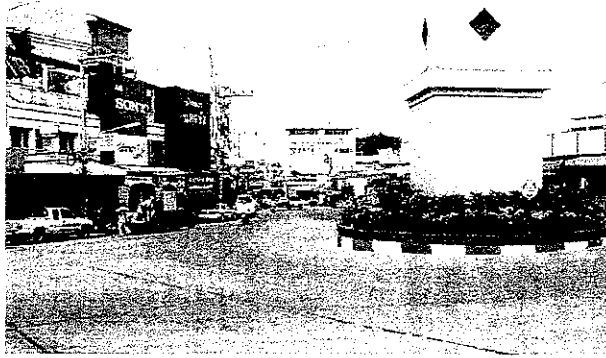
Cholburi Provincial Administration Organization, Cholburi Province



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- 1 Cholburi Provincial Administration Office
- 2 Brainstorming Workshop chaired by Mayor of Cholburi PAO
- 3 Cholburi Central Waste Disposal Facility is under construction. The left hand side building is sorting plant.
- 4 Weighbridge foundation
- 5 Composting Plant
- 6 Recycling Building
- 7 Some equipments have been arrived
- 8 A part of conveyor belt is waiting for installation

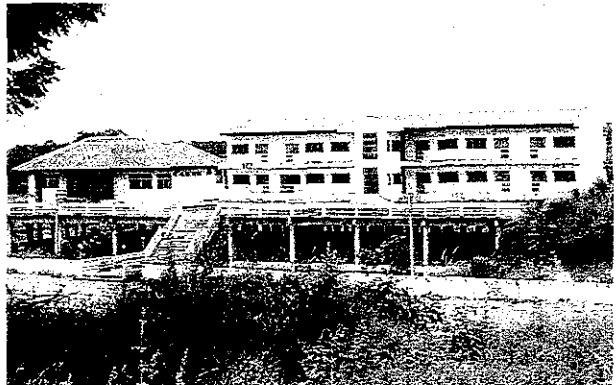
Sriracha Town Municipality, Cholburi Province



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- 1 General conditions in municipal area
- 2 Meeting with Mayor
- 3 Brainstorming Workshop chaired by Municipal Clerk
- 4 Group discussion during the workshop
- 5 Conditions of the municipal landfill with good management
- 6 Oxidation pond for leachate from landfill
- 7 Sriracha Town Municipality Office
- 8 Infectious waste incinerator at District Hospital

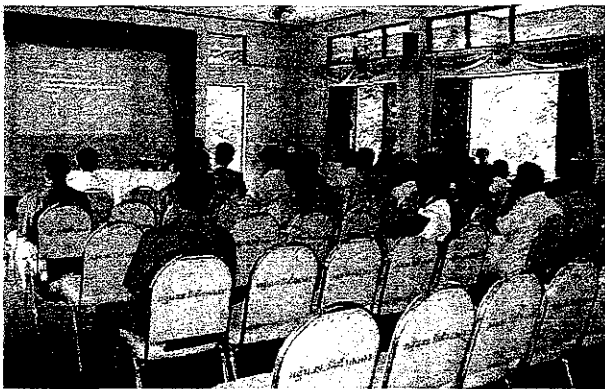
Chachoengsao Town Municipality, Chachoengsao Province



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- 1 General conditions in municipal area
- 2 Meeting with Vice Mayor
- 3 Brainstorming Workshop chaired by Mayor all time
- 4 Group discussion during the workshop
- 5 New landfill that could not be operated due to protest from TAO
- 6 Office and dormitory building of new landfill that could not be used
- 7 Chachoengsao Town Municipality Office
- 8 Infectious waste incinerator at private hospital

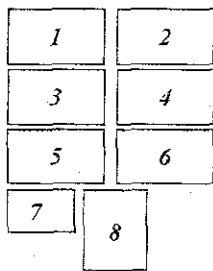
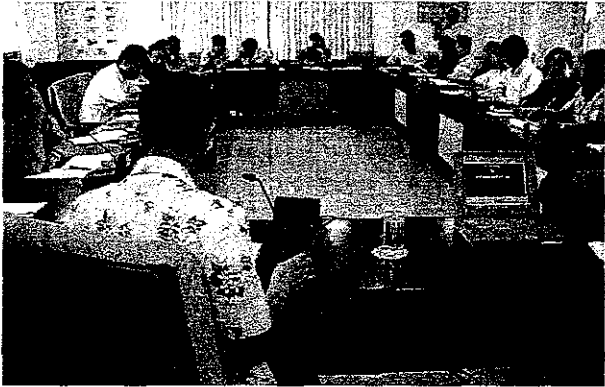
Koh Wai Sub-district Municipality, Nakhonnayok Province



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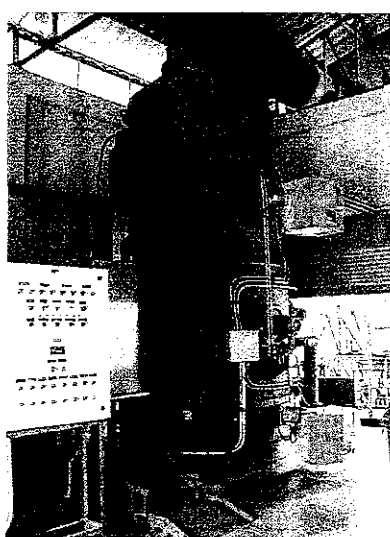
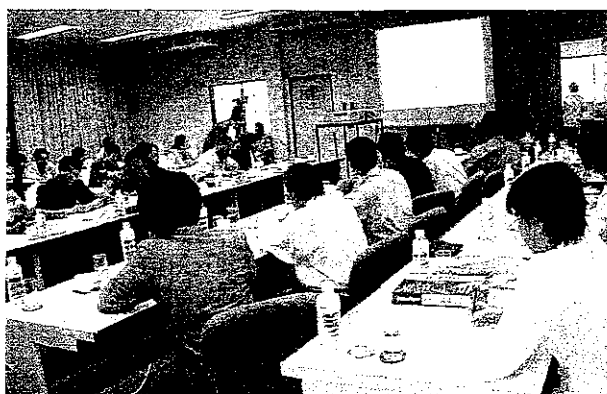
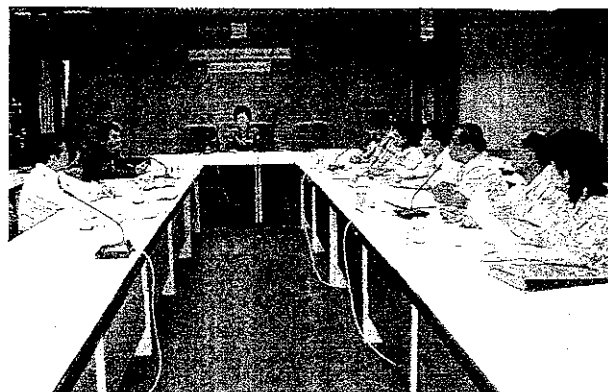
- 1 General conditions in municipal area
- 2 Another general view with clean canal
- 3 Koh Wai Sub-district Municipality Office
- 4 Meeting with Mayor
- 5 Brainstorming Workshop
- 6 Group discussion during the workshop
- 7 "Hand-made incinerator" for infectious waste at Public Health Service Center
- 8 Infectious waste incinerator at District Hospital

Prachantakham Sub-district Municipality, Prachinburi Province



- 1 General conditions in municipal area
- 2 Meeting with Mayor
- 3 Brainstorming Workshop chaired by District Chief
- 4 Group discussion during the workshop
- 5 Conditions of the municipal landfill
- 6 Syringes (infectious waste) were illegally dumped sometimes
- 7 Prachantakham Municipal Office
- 8 Infectious waste incinerator at Prachantakham District Hospital

Ratchaburi Town Municipality, Ratchaburi Province



- 1 General conditions in municipal area
- 2 Meeting with Mayor (Lady)
- 3 Brainstorming Workshop chaired by Mayor
- 4 Group discussion during the workshop
- 5 Transfer area before sending waste to private landfill
- 6 General view at private landfill
- 7 Ratchaburi Town Municipality Office
- 8 Infectious waste incinerator at Ratchaburi Town Hospital

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Abbreviations

ADB	Asian Development Bank
B.E.	Buddhist Era
BMA	Bangkok Metropolitan Administration
CTM	Chachoengsao Town Municipality
CWDF	Central Waste Disposal Facility
DF/R	Draft Final Report
DIW	Department of Industrial Works
DLA	Department of Local Administration
DOPA	Department of Provincial Administration
EPR	Extended Producer Responsibility
F/R	Final Report
GPP	Gross Provincial Products
GTZ	The German Agency for Technical Co-operation
HW	Hazardous Waste
IC/R	Inception Report
JBIC	Japan Bank for International Cooperation
JICA	Japan International Cooperation Agency
KWSM	Koh Wai Sub-district Municipality
LA	Local Administration
MOSTE	Ministry of Science, Technology and Environment
MOAC	Ministry of Agriculture and Cooperatives
MOI	Ministry of Interior
MONRE	Ministry of Natural Resources and Environment
MSW	Municipal Solid Waste
MSWM	Municipal Solid Waste Management
NESDB	National Economic and Social Development Board
NESDP	National Economic and Social Development Plan
NGO	Non Government Organization
NSCISLA	National Support Centre for the Improvement of SWM in Local Administrations
ONEP	Office of Natural Resources and Environmental Policy and Planning
O&M	Operation and Maintenance
PAO	Provincial Administration Organization

PCD	Pollution Control Department
PPP	Polluter Pay Principle
P/R	Progress Report
PSM	Prachantakham Sub-district Municipality
PWD	Public Works Department
RTM	Ratchaburi Town Municipality
SRTM	Sriracha Town Municipality
sq.km.	square kilometer
SW	Solid Waste
SWM	Solid Waste Management
TAO	Tambol Administration Organization
UEMP	Urban Environmental Management Project
UNDP	United Nation Development Program

1 Outline of the Study

1.1 Background

In the Kingdom of Thailand, the “Municipality” is the most well known form of local administration. Municipalities have been established in urban communities in Thailand since 1933. One of the main duties of a municipality is keep the municipal area clean including disposing of refuse and garbage.

Under the decentralization act of 1999, the government has been devolving functions and revenue to local authorities nationwide. Because of this development, local authorities are being required to deliver a wider range of public services. While the provision of some functions such as waste management requires the cooperation of local authorities and public agencies, most local authorities still prefer to perform these functions on their own instead of cooperating among themselves.

As a matter of fact, informal cooperation has been formed among local authorities but very few of them are involved in formal cooperation. As a result, there should be a study as to why local cooperation, as stated by law, is not widely practiced. What forms of local cooperation have been practiced? And how can cooperation among local authorities be promoted? Under these circumstances, the Department of Local Administration (DLA) in collaboration with Japan International Cooperation Agency (JICA) has decided to conduct the project entitled “The Study for the Development of Waste Management Systems in Local Areas in the Kingdom of Thailand”. In order to fulfill the objectives of the project, JICA appointed Kokusai Kogyo (Thailand) Co., Ltd. as the consultant of the study.

1.2 Objectives of the Study

The objectives of the Study are:

- (1) To study Thailand’s government policy on waste management in local areas.
- (2) To study the current situation on the waste management system of local governments in the study area.
- (3) To recommend a future program for the development of waste management systems in local governments
- (4) To recommend the establishment of a network among local governments for the introduction of an improved waste management system.
- (5) To recommend a future program for the improvement of the environmental administration system between municipalities (Tessaban) and Tambol Administration Organizations (TAO) through the Study on waste management.

1.3 Study Area

The Study covers six provinces, namely Choburi, Chachoengsao, Nakhonnayok, Phra Nakhon Si Ayutthaya, Prachinburi and Ratchaburi.

A list of the municipalities in the study area and their populations is shown in Annex 1.

However, from the various meetings among JICA, DLA and the study team, the target local administrations below (6 organizations in 5 provinces) have been selected as models of the study:

- | | |
|--|-----------------------|
| (1) Choburi Provincial Administration Organization | Choburi Province |
| (2) Sriracha Town Municipality | Choburi Province |
| (3) Chachoengsao Town Municipality | Chachoengsao Province |
| (4) Koh Wai Sub-district Municipality | Nakhonnayok Province |
| (5) Prachantakham Sub-district Municipality | Prachinburi Province |
| (6) Ratchaburi Town Municipality | Ratchaburi Province |

In the above selection, no local administration in Phra Nakhon Si Ayutthaya province has been selected.

1.4 Waste to be Covered Under the Study

This study shall cover municipal waste. As far as medical waste is concerned, a rapid diagnosis will be carried out based on existing information and data, and general recommendations for the improvement in the management of such waste in the target local authorities will be proposed.

1.5 Study Period

The Study starts on August 1, 2003 and ends on November 30, 2003.

1.6 Scope of the Study

In order to achieve the objectives mentioned above, the scope of work for the Study shall cover the following items:

- (1) Waste management problems and review of the roles of local governments in Thailand
 - National policy and current problems in waste management in local areas.
 - Current situation of reviewing the demarcation between the central government and local government on waste management
- (2) The administrative system for waste management in municipalities (Tessaban), and TAOs

- Current situation and long term plan for waste management
 - Administrative organization for waste management in municipalities
 - Current cost of waste management and forecast of revenue and expenditure in municipalities
 - Relationship with ministries concerned, communities, the public/private sectors, universities, and NGOs, etc.
 - Development of human resources on waste management in municipalities
- (3) Coordination among municipalities and/or TAOs in waste management
- Coordination among municipalities and its problem in waste management
 - Current situation of network among municipalities
- (4) Proposing best practices in waste management
- Waste management system in local areas (including house dust and medical waste)
 - Possibility to form a partnership with communities, the public/private sectors, universities, NGOs, etc.
 - Cooperation among municipalities and/or TAOs
- (5) Recommendation for administrative system on waste management
- Recommendation for central government
 - Recommendation for cooperation among municipalities and/or TAOs
 - Recommendation for municipalities
 - Human resource development plan
 - Wrap-up Seminar targeted for stakeholders (residents, local government officers, universities, NGOs, and others)

1.7 Organization of the Study and the Assignment of the Study Team

1.7.1 Organization of the Study

On the basis of the Scope of Work and the Minutes of Meeting signed by both the Thai side and the Japanese side in the course of the preparatory stage, the Department of Local Administration (DLA) acts as the counterpart agency to the JICA Study Team and also as a coordinating body in relation with other relevant organizations for the smooth implementation of the study. "Other relevant organizations" will include the Department of Provincial Administration (DOPA) of the Ministry of Interior (MOI), the Office of Natural Resources and Environmental Policy and Planning (ONEP), Pollution Control Department (PCD) of the

Ministry of Natural Resources and Environment, the Ministry of Public Health (MOPH) and others if appropriate.

The organizational structure of the Study is shown in Figure 1-1 as below.

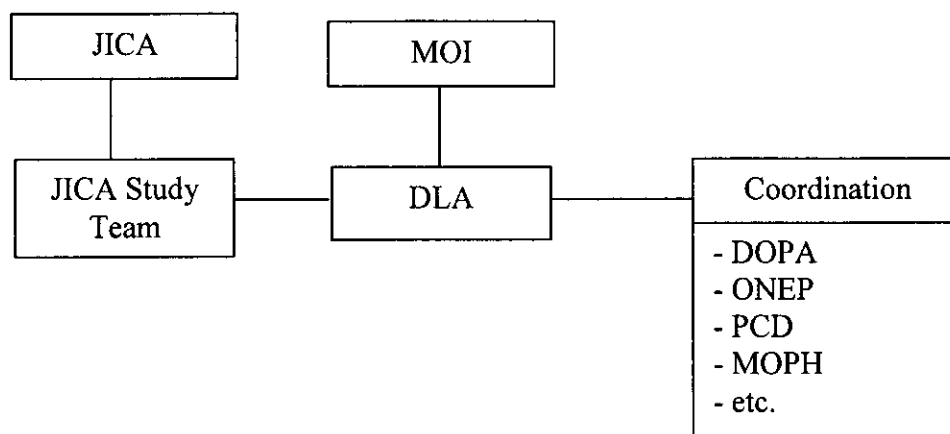


Figure 1-1: Organizational Structure of the Study

1.7.2 Members of the Study Team

The members of the Study Team are as follows:

Assignment	Name
Project Manager/Waste Management Administration	Mr.Precha Chuntakorn
Waste Management	Mrs.Wilairat Saifon
Organization and Law Specialist	Mr.Samrieng Mekkiengkrai
Research Assistant	Ms.Yuree Sahawongwatana

1.7.3 Assignment of the JICA Study Team

The assignment schedule of the Study Team Members is shown in the Figure 1-2 as follows:

Position	Name	Year 2003			
		Aug.	Sep.	Oct.	Nov.
Project Manager/ Waste Management Administration	Mr.Precha Chuntakorn	[Solid black bar]			
Waste Management	Mrs.Wilairat Saifon	[Solid black bar]	[Solid black bar]	[Solid black bar]	[Solid black bar]
Organization and Law Specialist	Mr.Samrieng Mekkiengkrai	[Solid black bar]	[Solid black bar]	[Solid black bar]	
Research Assistant	Ms.Yuree Sahawongwatana	[Solid black bar]			
Reports		▲ IC/R	▲ PR/R	▲ DF/R	▲ F/R

Figure 1-2: Assignment Schedule of the Study Team

1.7.4 Reports

The Study Team will submit five reports to the JICA Thailand Office. The languages for the reports are English and Thai.

The report submission schedule and number of copies are tabulated in Table 1-1 as follows:

Table 1-1: Number of Report Copies to be submitted

Report	Number of Copies		Submission Date
	Thai	English	
Inception Report	15	5	August 25, 2003
Progress Report	15	5	September 25, 2003
Draft Final Report	20	10	November 10, 2003
Final Report	20	10	November 28, 2003
Executive Summary	20	10	November 28, 2003

1.8 Current State and Problems of SWM in the Study Area

Before the study team was assigned from JICA as consultants of the project, the team had conducted a preliminary survey of three municipalities in the study area in order to collect basic information and to understand the current situation of waste management by the local administration in the study area. The target municipalities studied in the preliminary survey are listed below.

Item	Province	Name of Municipality	Visiting Date
1	Prachinburi	Prachantakham	10 July 2003
2	Nakhonnayok	Koh Wai	10 July 2003
3	Ratchaburi	Ratchaburi	17 July 2003

From the results of the preliminary survey, the study team obtained basic information of the study area and structure of the local administration, and set up the general policies of the study as guideline before implementation of the project as below.

1.9 Policies of the Study

Based on the study team's experience thus far, the features of this project, and the present situation and problems concerning solid waste management by local administrations, the basic policies of this project shall be as follows:

a. Immediate Implementation of the Project

The project shall be conducted in a short period of four months and cover a large area, including six provinces. Furthermore, after the JICA Thailand Office signs on the contractor it deems suitable, they along with the Department of Local Administration (DLA) will select the municipalities in the project area. As of yet, a short list has not been made. Therefore, the study reports containing statistical data, mid-term and long-term plans and problems

with the sanitary environment, possessed by the ministries, agencies and local administrations shall be used to the extent possible in order to avoid wasting time on field surveys and information gathering, with the aim of improving work efficiency. In order to promptly proceed with the project, the cooperation of the various agencies is essential.

b. Project Implementation in Consideration of the Characteristics of the Counterpart

If asked which government agency is in charge of waste management in Thailand, the majority of people would probably say the Pollution Control Department (PCD) under the Ministry of Natural Resources and Environment (MONRE). In a sense that is correct. PCD deals with waste from the standpoint of environmental management and is carrying out a wide range of activities including research in waste management and the prevention of environmental pollution taking advantage of science and technology. Meanwhile, the counterpart in this project, the Department of Local Administration (DLA) under the Ministry of Interior, is tackling waste problems as part of local administrative management. Therefore, it is necessary to examine more closely the relationship between the central government and local administration and among local administrations in regard to waste management. Only after fully understanding the characteristics of the counterpart, will the project proceed.

c. Sustainability

What makes a waste management project significantly different from the *infrastructure improvement projects* (e.g. roads and dam construction) is low investment capital and high operation and maintenance expenses. For the project's success, emphasis will be placed on the operation and maintenance plan rather than the facility and equipment plan. The ability to sustain the waste management project is highly dependent on the existence of a financial source. Although an extensive restructuring of the financial system is not an easy task, to cope with these realities an improvement plan will be made.

d. Development and application of appropriate technology

The operation and maintenance of waste disposal sites is being carried out by the various municipalities, which have to rely on the technology, financial resources and personnel they currently possess. Therefore, in technical planning, appropriate technology that each municipality is able to sustain both financially and technically shall be developed and used.

1.10 Tasks Faced in Study and Approach to Solving Them

Based on the present situation of solid waste management and giving careful consideration to the works requested, Kokusai Kogyo (Thailand) Co. Ltd determined that the problems faced in implementing the project will be as follows:

a. Improvement of final disposal site

The problems faced with final disposal sites in the project area and common measures are summarized in Table 1-2 as follows:

Table 1-2: Problems Faced with Final Disposal Sites and Common Measures

Problem	Main Strategy
Odor, scattering of garbage, deterioration of the landscape	Soil covering
Medical Waste	Disposal in designated area, soil covering
Leachate	Collection and treatment of leachate
Difficult for waste collection trucks to enter due to insufficient surface compaction	Soil covering, surface compaction
Illegal dumping	Installation of gate and fence, assignment of guard man

Improvement of disposal sites shall be done through low-cost methods with greatest effectiveness whenever possible.

b. Improvement of information exchange between the central government and local administrations in regard to waste management

According to the MONRE's policy on waste management, a centralized large-scale disposal site shall be established in each province, and the concerned local administrations will either directly transport waste to the site or transport it via a transfer station. The existing disposal sites in the municipalities will be used until they are full or used as transfer stations. Although there are local administrations that conduct activities in accordance to this concept, there are also municipalities that use private dump sites or negotiate directly with other municipalities that possess large disposal sites at a fee.

Whether or not information on waste management is being well circulated and whether or not management methods are being presented shall be closely examined to determine the cause of the awareness gap between the central government and local administrations, and recommendations on areas that need to be improved shall be made.

c. Building cooperation among local administrations concerning waste management

One thing that became evident through the short-term field survey is that even in municipalities that appear to still have a lot of open space compared to the Bangkok area, the land for constructing waste disposal sites is extremely limited. Therefore, municipalities only allow local waste to be dumped at the disposal sites they manage in order to extend the life of the site as long as possible. Some municipalities, whose disposal sites are full, have asked permission to dump waste in neighboring municipalities but, for this reason, were refused. Furthermore, because some municipalities have no land for

constructing final disposal sites, they are paying to use private land (owned by individuals), which was once farmland, as dumpsites.

Because municipalities are not permitted to build new disposal sites based on government policy, they will have to transport waste to disposal sites far away. It is proposed that the local administrations break away from this uncooperative relationship, which is ineffective in terms of cost and has a negative impact on the environment, and build a network system not only among local administrations but also a partnership with communities, the public/private sectors, universities, NGOs, etc. that will lead to a win-win situation.

d. Strengthening of organization for waste management

Each municipality has a 5-year mid-term development plan and an annual development plan. However, these plans aim at a budgetary system and have no mention of a waste management plan. In addition, PCD published the “Domestic Waste Management Manual for Local Administration” in 2000 in order to promote proper waste management by the local administrations. However, because there are only a limited number of staff members knowledgeable about waste management in the local administrations, it is certain that the distribution of the manual alone will not improve effectiveness. It is a given fact that for proper waste management it is necessary to understand the need to take appropriate measures to solve problems after having full understanding of the present situation.

Because the duration of this project is short, the study team will not be able to conduct technology transfer for the counterpart and local administrative staff regarding methods for analyzing problems and selecting rational reform measures for administration management. However, a plan shall be formulated for improving administrative organization and developing human resources regarding waste management.

e. Public finance reform

In order to fundamentally reform waste services, it is necessary to increase funding. However, that is difficult to do in a short period. Management and O&M costs for waste disposal shall be kept within the existing budget and efforts shall be made to reduce costs by improving efficiency including expenditure on waste collection and transport and disposal sites. The potential for sharing use of disposal sites with neighboring municipalities will be examined and the best practice shall be proposed.

1.11 Plan of Operation

The Study commences in August 2003 and ends in November 2003. The plan of operation is drafted and described below.

The work schedule is illustrated in Figure 1-3 as follows:

Year	2003											
	August			September			October			November		
Item												
Study	A			B			C			D		
Reports			▲ IC/R			▲ PR/R					▲ DR/R	▲ FR

Figure 1-3: Work Schedule of the Study

Below is the outline of the work procedure.

A. Preparatory Work (August 1-August 24, 2003)

- A1 Discussion with JICA and the counterparts
- A2 Determination of target municipalities
- A3 Collection and review of data and information
- A4 Study on national policy on waste management in local areas
- A5 Study on the demarcation between the central and local governments on waste management
- A6 Planning for workshops
- A7 Preparation of the Inception Report (IC/R)

B. First Field Study (August 25-September 24, 2003)

- B1 Submission and discussion of the IC/R
- B2 Study on the general conditions in municipalities and TAOs
- B3 Study on the administrative system in municipalities and TAOs
- B4 Study on SWM conditions in municipalities and TAOs
- B5 Study on coordination among municipalities and/or TAOs in waste management
- B6 Study on the current cost of waste management and forecast of revenue and expenditure in municipalities
- B7 Study on the relationship among local administrations and with the ministries concerned, communities, the public/private sectors, universities and NGOs, etc.
- B8 Study on present medical solid waste management
- B9 Supplementary studies
- B10 Workshops
- B11 Establishment of goals, targets and strategies for the future improvement program

B12 Preparation of P/R

C. Second Field Study (September 25-November 10, 2003)

C1 Submission of P/R

C2 Supplementary studies

C3 Formulation of the future improvement program for the waste management system of local administrations

C4 Formulation of the network establishment program

C5 Formulation of the human resources development plan

C6 Planning for Wrap-up Seminar

C7 Preparation, submission, and discussion of DF/R

D. Final Study (November 11-November 30, 2003)

D1 Wrap-up Seminar

D2 Preparation and submission of the F/R and Executive Summary