PART *I*

Current Situation of the Solid Waste Management

Chapter 1

Introduction

1 Introduction

1.1 Background

With the assistance of the Ministry of Environment (MoE), the World Bank, and the Mediterranean Environment Technical Assistance Program (METAP), the Government of Turkey aims to improve the nation's solid waste management (SWM). In February 1996, the government began the Study on Appropriate Solid Waste Management Practice (SASWMP) to provide guidelines for measures to improve SWM. The SASWMP proposes seven pilot projects, which includes the preparation of an SWM plan at a regional level.

The regional SWM plan aims to establish an inter-municipal treatment and disposal system. Although all municipalities carry out their respective solid waste collection and disposal services, such services are inefficient due to insufficient resources: technical, human, and financial. Improving such conditions would require the grouping of several municipalities and providing them with the necessary manpower, technical resources, and financial resources.

The SASWMP has designated the greater municipalities (GMs) of Adana and Mersin, both located within the Mediterranean Region of Cukurova as model areas for the regional SWM plan, and proposes a plan that would cover both cities. As of 1998, the population in Adana GM and Mersin GM totalled 1.19 million and 635 thousand, respectively.

The SWM system in both cities face the following problems, and an SWM plan is imperative to implement the required improvements, the formulation of .

- Open dumping in the final disposal site or the lack of environmental protection has affected the nearby environment. Also the final disposal sites are managed inadequately as seen by the mixed disposal of general and infectious wastes.
- New final disposal sites are urgently needed as the existing final disposal sites are nearing its full capacity.
- There is a lack of financial sources necessary to improve the conditions.

Given these conditions, the Government of Turkey requested assistance from the Government of Japan for the implementation of the "Study on Regional Solid Waste Management for Adana-Mersin in the Republic of Turkey" (the study).

In response, the Japan International Cooperation Agency (JICA) -- the official agency responsible for the implementation of the technical co-operation -- decided to implement the study in close co-operation with the relevant authorities of the Government of Turkey.

Kokusai Kogyo Co., Ltd., the consultant appointed by JICA, carried out the study.

1.2 Scope of the Study

1.2.1 Objectives of the Study

The objectives of the study are to:

- Formulate a master plan (M/P) to improve regional SWM by 2020, focusing on the greater municipalities of Adana and Mersin.
- Conduct a feasibility study (F/S) on the priority project(s) to be selected from the M/P.
- Transfer technologies for SWM to counterpart personnel in the course of the study.

1.2.2 Study Area

The study covers the provinces of Adana and Icel as shown in the Location Map of the Study Area. In accordance with the results of the discussion on the Inception Report (IC/R) recorded in the M/M on the IC/R, the study focused on the greater municipalities of Adana and Mersin as shown in the Location Map of the Target Area for the M/P. As a result the target areas for the M/P are those under the jurisdictions of the greater municipalities of Adana and Mersin More precisely, adjacent municipalities (AM) of Adana and Mersin GMs were excluded from the target area.

1.2.3 Solid Waste to be Covered Under the Study

The types of wastes covered by the study are household waste, market waste, commercial waste, street sweeping waste, office waste, and medical waste. For medical wastes, however, the management plan will be formulated based on available data.

1.2.4 Target Year

The master plan covers the period between 2000 and 2020.

1.3 Policies of the Study

a. Characteristics of an SWM Study

The major characteristics of an SWM study are as follows:

- The study had to be carried out during the time when the existing SWM system was operating.
- SWM has directly related to the daily life of the people. The proposed plan would not be sufficient and workable if it only considered the intentions of the administrators and officers concerned in SWM. It had to take the opinions of the citizens into consideration as well.
- An appropriate SWM system cannot be established without the mutual co-operation of the public and administration. The study, therefore, must understand the natural, social, and economic settings of the study area; its

historic and cultural background, the educational level of the local population, and their traditions and lifestyles, must be included to realise the SWM plan.

- When formulating the SWM plan, it is inappropriate to simply apply standard planning methods used in other countries.
- An SWM study entails planning methods suitable to the study area based on the intrinsic factors of the area: natural, social, and economic conditions; current SWM practices; and the lifestyles of the local people.

As mentioned this study began with the acknowledgement of the Turkish national SWM plan, SASWMP (Study on Appropriate Solid Waste Management Practice, February 1996). SASWMP stipulates the directions to be taken for national improvement on SWM but does not refer to concrete measures for the individual improvement of regions and cities. With this in mind, this study carried out many field surveys, e.g. WACS, POS, and recycling system survey to understand both the SWM characteristics, and the regional characteristics of the study area.

b. Basic Policies of the Study

Considering the characteristics an SWM study and background of the study stated above, the basic policies of this study consisted of the following five elements:

b.1 Practicability

The technical level, the administrative capabilities, and the operative capabilities of the target municipalities and their cleansing bureaux must improve to realise the SWM plan. Although these improvements should be dealt with during the study, placing a heavy emphasis on these factors would make the project less feasible.

On the one hand, the improvement of the administrative and the operative capabilities is necessary in consideration of the rapid urbanisation of the target municipalities, and the need to solve the waste problems that are likely to intensify in the future. The organisational and institutional system should be extensively overhauled to actualise any improvement.

Problems that could hamper these improvements are addressed in this study through short-term, mid-term, and long-term plans. The short-term plan is one that the target municipalities and their cleansing bureaux are actually capable of implementing. It is completed with the premise to improve the feasibility of the SWM plan. The mid-term and long term plans contain full-scale countermeasures including organisational and institutional measures, and legislative readjustment for serious problems forecast to arise in the future. There will be sufficient time to prepare for the implementation of the mid-term and long-term plans.

b.2 Sustainability

What makes an SWM project significantly different from other infrastructure improvement projects (e.g. roads and dam construction) is low capital investment and high operation and maintenance expenses. For the project's success, emphasis is placed on the operation and maintenance plan rather than the facility and equipment plan. The ability to sustain the SWM project is highly dependent on the financial source. Although the extensive restructuring of the financial system is difficult short-term, mid-term and long-term plans are made to cope with these actualities. The

short-term plan focuses on the effective improvement of the present SWM system considering the system's limited sources of funding, while the mid-term and long-term plans deal with extensive improvement measures that could cope with future problems.

b.3 Appropriate Technology

As stated previously, the operation and maintenance plan is an essential component of the SWM plan, and the target municipalities, with their respective cleansing bureauxs, should independently implement this plan using their own technology, financial resources, and human resources. As it is necessary for this plan to be on par at least with the capabilities of the target municipalities, the technical system plan takes into consideration both the use of technology available in Turkey, and the introduction of technology that is sustainable in terms of the finances and skills of the target municipality.

b.4 Participation

Because SWM is related directly to public activities, any alterations in the system directly affect the public. Recycling at generation and separate collection cannot be effectively implemented without their co-operation. The same can be said with the operation of SWM facilities, such as a composting plant and a recycling plant. Public participation is encouraged from the planning stage, and their opinions fully reflected in the plan; participation and the implementation of the SWM plan are ensured in this way.

b.5 Joint Study

This policy was established considering the indispensable co-operation of the relevant authorities of the Government of Turkey (namely the MoE and the Greater Municipalities of Adana and Mercin) to effectively conduct the study in conformity with the policies stated in sections **b.1 to b.4**. Since this SWM project places an importance on the operation rather than the construction of the facilities, the selection and implementation of a plan depended on the decisions of the counterpart. Bearing this in mind, their decisions on the items below were requested; for this purpose necessary materials and documents were prepared, and a Steering Committee was formed.

1. Approval of the Inception Report (IC/R).
2. Determining target municipalities through workshops, and the possibility of establishing an inter-municipal treatment and disposal system.
3. Determining the M/P concept and basic policies.
4. Selection of priority project sites including the final disposal sites.
5. Approval of Progress Report (P/R) (1).
6. Selection of pilot projects.
7. Approval of the Interim Report (IT/R), which included the M/P (draft), selection of priority projects, and contents of the IEE.
8. Implementation of pilot projects.

9. Approval of P/R (2).

10. Approval of the Draft Final Report (DF/R), which includes the results of the EIA, conclusion of the F/S, Implementation Plan, etc.

1.4 Work Schedule of the Study

The study began in July 1998 based on the Scope of Work (S/W) signed between the Turkish Government and JICA, and ended in January 2000.

The study consisted of the following two phases.

Phase 1 (July 1998 - January 1999)

Study on the Present SWM Condition and Formulation of the Master Plan

Phase 2 (February - January 2000)

Feasibility Study on the Priority Projects

The study schedule is shown in Figure 1-1.

Phase	Phase 1: Study on the Present SWM Condition and Formulation of the Master Plan							Phase 2: Feasibility Study on the Priority Project(s)									
Year	1998							1999									
Month	Jul.	Aug.	Spt	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Work Item	[A] Preparation Work in Japan [B] First Study Work in Turkey [C] First Study Work in Japan [D] Second Study Work in Turkey [E] Third Study Work in Turkey [F] Second Study Work in Japan [G] Fourth Study Work in Turkey [H] Third Study Work in Japan																
Reports	IC/R▲				P/R(1) ▲			IT/R▲				P/R(2) ▲				DF/R▲	F/R▲
Total Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Month	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Team Leader & Solid Waste Management Plan																	
Environmental Consideration																	
Disposal Plan (1) & Recycling Plan																	
Disposal Plan (2) & Medical Waste Plan																	
Collection and Haulage Plan																	
Waste Amount and Compositon Survey & Analysis of Waste Flow																	
Facility Design & Cost Estimation																	
Management and Financial Plan																	
Public Education & Participation Plan																	
Organisational and Institutional Development Plan																	
Administrative Co-ordinator																	

A1 Collection and reviweal of data and information
B1 Submission and discussion of the IC/R
B2 Study on the general conditions in the study area
B3 Study on SWM conditions in the study area
B4 Study on candidate final disposal sites
1)Asessment of candidate sites
2)Discussions on administrative proccedures
3) TOR of the EIA
B5 Workshop 1
B6 Determination of target municipalities
B7 Supplementary study on target municipalities
B8 Field investigation (summer)
1)WACS
2)Time and motion survey
3)POS
4)Opinion survey on medical institutions
5)Survey on recycling activities
B9 Specifications for the weighbridge and its foundation
B10 Assessment of the present conditions and confirmation of key issues
B11 Discussion and formulation of a socio-economic concept
B12 Setting up the M/P concept
B13 Supervision of weighbridge installation
B14 Establishment of goals, targets, and strategies for the M/Ps
B15 Discussions on the priority project and the second study work in Turkey
B16 Preparation, submission, and diccussion of P/R 1
A2 Preparation of the IC/R
C1 Examination of alternatives and selection of the best alternative
C2 Formulation of the M/Ps (draft)
C3 M/Ps (draft) cost estimation
C4 Phased implementation plan
C5 Evaluation of M/Ps
C6 Selection of priority projects
C7 Preparation of the IT/R
D1 Discussion on the IT/R
D2 Workshop 2
D3 Supplementary surveys
D4 Waste disposal amount survey in Adana
D5 Field investigation (winter)
1) WACS
D6 Concept of the priority projects
D7 Field investigation for the priority projects
1)Topograhpic surveys
2)Soil investigations
3)Environmental survey for the EIA
D8 Field investigations for the modification of the M/Ps (draft)
D9 Discussion on the modification of the M/Ps (draft)
E1 Discussion on the outline of the priority projects
1)Priority project plans
2)Priority project evaluation
E2 Preparation, submission, and discussion of P/R 2
F1 Modification of the M/Ps (draft)
F2 Formulation of priority projects
F3 Project evaluation
F4 Project implementation plan
F5 Preparation of the DF/R
G1 Submission and discussion of the DF/R
G2 Workshop 3
G1 Preparation of the F/R

Study work in Turkey　　Study work in own country

1.5 Study Organisation and Persons Involved

1.5.1 Study Organisation

The Ministry of Environment (MoE) was the counterpart agency and the co-ordinating body for negotiations with other governmental and non-governmental organisations concerned.

The MoE organised a counterpart team for the study team. The counterpart team consisted of a number of personnel in charge of various aspects of SWM.

The steering committee, organised by the Turkish side, convened at the submission of the IC/R, P/R (1), IT/R, P/R (2), and DF/R to make the strategic decisions related to the study.

The Advisory Committee, which was organised by JICA, provided JICA with necessary advice. The study's organisational structure is shown in the figure below.

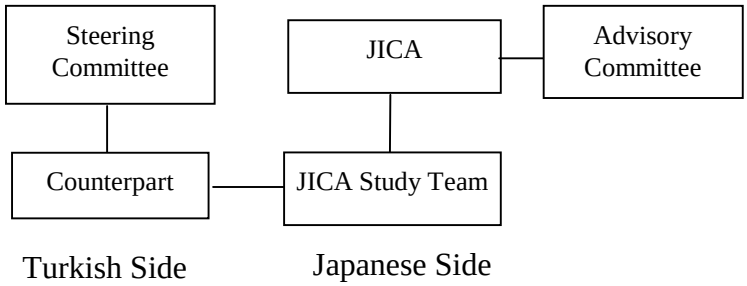

Figure 1-2: Study Organisational Structure

1.5.2 Persons Involved

a. Member of Turkish Steering Committee

Chairman of the Committee	Deputy Undersecretary, MoE
Other Members	Mayor of Adana Greater Municipality (GM) Mayor of Mersin GM

b. Member of Turkish Counterpart

Name	Position
Ministry of Environment	
Sami AGRIGUN	General Director, Directorate of Environmental Pollution Prevention and Control
Umit GENC	Head, Waste Management Department
Filiz BAYCAN	Environmental Engineer
Akif TURUN	Environmental Engineer
Hakan CELIK	Hydrogeological Engineer
Adana Province	
Okkes BOZAN	Director, Adana Province Environmental Department
Mahmet A. GUZELAND	Engineer, Adana Province Environmental Department

Name	Position
Zehra DURAK	Engineer, Adana Province Environmental Department
Adana Greater Municipality	
Nurettin CELMEOGLU	Foreign Relations Advisor of Mayor
Fahrettin ASICI	Director, Environmental Protection Department
Hülya KUS	Chemist, Environmental Protection Department
Icel (Mersin) Province	
Zeynep YALDIZ	Engineer, Icel Province Environmental Department
Mersin Greater Municipality	
Ilhan SAYAN	Responsible Engineer of the Municipality
Zuhal OZNANAR	Engineer, Environmental Department
Feray ALTUG	Engineer, Environmental Department

c. Members of the JICA Advisory Committee

Assignment	Name	Position
Chairman & Solid Waste Management Plan	Takashi IKEGUCHI	Section Chief, Waste Disposal Engineering Section, National Institute of Public Health Department of Waste Management Engineering
Organisational and Institutional Development Plan	Kazuchika SATO	Development Specialist in Industrial Management, Institute for International Co-operation, Japan International Co-operation Agency (JICA)

b. Members of the Study Team

Assignment	Expert	Nationality
Team Leader & Solid Waste Management Plan	Susumu SHIMURA	Japanese
Environmental Consideration	Shinya KAWADA	Japanese
Disposal Plan (1) & Recycling Plan	Jacob S. PEDERSEN*[1]	Danish
	Tamotsu SUZUKI	Japanese
Disposal Plan (2) & Medical Waste Plan	Takeshi TOMIYASU	Japanese
Collection and Haulage Plan	Kamil S. SORGUN	Turkish
Waste Amount and Composition Survey & Analysis of Waste Flow	Precha CHUNTAKORN	Thai
Facility Design & Cost Estimation	Naofumi SATO	Japanese
Management and Financial Plan	Kozo BABA	Japanese
Public Education & Participation Plan	Jun TANIMIZU*[1]	Japanese
	Masaharu KINA	Japanese
Organisational and Institutional Development Plan	K. Taylan DERICIOGLU	Turkish
Administrative Co-ordinator	Tomomi KITAJIMA	Japanese

Note *1: Deceased

1.6 Reports

The JICA study team prepared and submitted the following reports in English to the Government of the Republic of Turkey.

	Report	Period of Submission	Number of Copies to be Submitted
1	Inception Report (IC/R)	beginning of August 1998	20 copies
2	Progress Report (1) (P/R 1)	mid-November 1998	20 copies
3	Interim Report (IT/R)	mid-February 1999	20 copies
4	Progress Report (2) (P/R 2)	mid-June 1999	20 copies
5	Draft Final Report (DF/R)	mid-October 1999	Main Report 30 copies Supporting Report 30 copies Data Book 30 copies Summary 30 copies EIA Report 30 copies
6	Final Report (F/R)	mid-November 1999	Main Report 75 copies Supporting Report 75 copies Data Book 75 copies Summary 75 copies

1.7 Technology Transfer

During the study, the study team pursued technology transfer to the Turkish counterpart through the following:

- Joint study
- Conduct of the pilot projects
- Explanation of reports
- Counterpart training in Japan under the Japanese technical co-operation scheme
- Workshops on SWM technologies