

Annex 12

*Institutional Development Plan for
the Project Implementation*

Contents

| | Page : |
|---|--------------|
| 12 Institutional Development Plan for the Project Implementation | A12-1 |
| 12.1.1 Administration and Organisation..... | A12-1 |
| 12.1.2 Legislation and Enforcement | A12-5 |
| 12.1.3 Financial System..... | A12-6 |
| 12.1.4 Privatisation and Contracting System..... | A12-8 |
| 12.1.5 Monitoring and Information Management System..... | A12-9 |
| 12.1.6 Human Resources Development..... | A12-11 |
| 12.1.7 Public Education and Co-operation | A12-12 |
| 12.1.8 Guidelines | A12-15 |
| 12.2 For Cimsa Site Development..... | A12-18 |
| 12.2.1 Administration and Organisation..... | A12-18 |
| 12.2.2 Legislation and Enforcement | A12-23 |
| 12.2.3 Financial System..... | A12-24 |
| 12.2.4 Privatisation and Contracting System..... | A12-26 |
| 12.2.5 Monitoring and Information Management System..... | A12-27 |
| 12.2.6 Human Resources Development..... | A12-29 |
| 12.2.7 Public Education and Co-operation | A12-29 |
| 12.2.8 Guidelines | A12-33 |

List of Tables

| | Page : |
|--|--------|
| Table 12-1: Staffing of Compost and Sorting Plants in Adana | A12-4 |
| Table 12-2: Advantages and Disadvantages of Cleansing Tax System by Waste Amount and by Building Use | A12-7 |
| Table 12-3: Education Materials in Adana GM..... | A12-12 |
| Table 12-4: Staffing of Compost and Sorting Plants at Cimsa Site..... | A12-22 |
| Table 12-5: Advantages and Disadvantages of Cleansing Tax System by Waste Amount and by Building Use in Mersin GM | A12-25 |
| Table 12-6: Education Materials in Mersin GM..... | A12-30 |

12 Institutional Development Plan for the Project Implementation

12.1.1 Administration and Organisation

a. General

The Ministry of Environment complains in general that; while solid waste collection activities are more or less successfully carried out by the district municipalities, unfortunately the greater municipalities have failed to a large extent in accomplishing their duties related to recycling and sanitary landfilling. The Adana Greater Municipality should be now in the position to get rid of such an image in the views of the Ministry of Environment and realise an exemplary planning action with respective operations. These attempts must be models for ministerial extension services and give an impulse for similar attempts in other greater municipalities.

Each municipality or any other municipally authorised agency dealing with dumping, landfilling and final waste disposal have to fulfil certain administrative obligations and regularly inform the Ministry of Environment about their previous and on-going activities in this regard. This obligation serves for the purpose that; the Ministry of Environment firstly gets acquainted with the current landfill practices in municipal areas, and secondly, be informed about prospective activities which need to be evaluated, oriented and formally controlled.

Likewise, the Greater Adana Municipality should also inform the Ministry of Environment on its contemplations regarding the further use of the Sofulu site for sanitary landfill purposes for a certain period as well as its rehabilitation works to be taken up, concurrently. This administrative duty is also valid for the identification of location for the new sanitary landfill site, at which sorting and compost plants will also take place. It has to be substantially justified that, those decisions are made in accordance with a series of criteria as set forth by respective regulations of the Ministry of Environment.

The Adana Greater Municipality should be aware of the fact that, necessary formal procedures must be fulfilled by respective municipalities in Turkey to allocate the disposal sites in the urban development and land use plans and precisely indicate whether they are currently used or closed. As legally envisaged, these areas are prohibited to settlement actions, and this issue has to be adequately pursued throughout the decision and enforcement process running under the initiative of the municipal councils and municipal parliaments. The prohibit duration is 30 years for present landfill sites and 40 years for closed landfill sites. It is also a compulsory administrative duty of the Adana Greater Municipality to obey these judicial provisions, which are in close connection with prospective activities in solid waste management.

In compliance with prospective activities, administrative liabilities must be identified and organisational schemes must be developed for;

- Further operation of the present landfill in Sofulu under sanitary conditions and its concurrent rehabilitation,

- Operation of a new sanitary landfill site,
- Operation of a new sorting plant and
- Operation of a new compost plant.

b. Further Operation and Rehabilitation of Sofulu

It falls under the responsibility of the Adana Greater Municipality to look after the fulfilment of managerial and operational requirements as well as technical provisions and specifications, as set forth in respective regulations and instructions of the Ministry of Environment, related to sanitary landfill management. While layering the new wastes by taking necessary measures and meeting requirements of a sanitary waste disposal practice, the Adana Greater Municipality should also provide the appropriate network for gas absorption and leachate collection along with adequate discharge and outlet systems prior to laying a surface cover for closure.

According to regulations, the final disposal sites have to be surrounded by fence. Entrances to and departures from the site have to be supervised and controlled. A guard cottage should be constructed along with an operation room and a weighbridge. All these requirements are regrettably not met in Sofulu, and therefore, more importance need to be attached in order to ensure a serious and proper management and service.

Those private and municipal agencies or corporate entities which are responsible for the operation of final disposal site should legally employ a technician, who has to be in charge of the control of wastes entering into the site as well as of landfilling operations within the site. The operator agency of the disposal site is obliged to prepare an operation plan in compliance with Solid Waste Sanitary Landfill Operations Procedures as developed by the Ministry of Environment. Within the framework of this operation plan, certain monitoring activities must be carried out; primarily, leachate and gas emissions, and the results of periodical measurements must be forwarded to the Ministry of Environment, if required. These measuring and monitoring obligations are valid for the following 10 years upon the termination of the sanitary landfill operations and closure of the site.

There are also some subsidiary legal obligations pertaining to two main concerns. One of them is the training of personnel on environmental risks and the other one is the applications of requirements for cleanliness in working place. The training of personnel on environmental protection practices is not only necessary for himself, but also for the welfare of his human and natural environment, as well. They should be sufficiently informed about the risks of their occupational engagement and be trained about protection measures on the job. Sanitation and disinfection of work garments, equipment and vehicles constitute a significant duty to be taken up, respectively. Trucks and excavators operating in the landfill site must be cleaned before leaving the site. The municipal administration is in this regard legally instructed to look after the prompt loyalty to training and sanitation requirements by the contractor or other assigned agency. This principle naturally applies for the landfill operations of the Adana Greater Municipality, as well.

c. Rehabilitation and Sanitary Landfilling at Sofulu Site

In the management and operation of a sanitary landfill site, the minimum level of staffing varies, depending on the quantity of waste received as well as the method applied in landfilling operations. For those landfill sites with a capacity over 250 ton per day, where waste is placed and compacted by machines, a reasonable staffing should include the following personnel:

| Personnel | Number | |
|------------------|-----------|--------------------|
| Personnel | | |
| Site Manager | 1 person | (2002-2005) |
| Waste controller | 1 person | (2002-2005) |
| Operator | 5 person | (2002-2005) |
| Driver | 3 person | (2002-2005) |
| Worker | 2 person | (2002-2005) |
| Security guard | 2 person | (2002-2005) |
| Total | 14 | (2002-2005) |

In identification of the definitive personnel size, mainly three criteria have to be referred:

- i. waste volume handled
- ii. number of work shifts a day
- iii. mechanisation level

Thereafter the personnel size needed for sanitary landfilling operations on Sofulu site or on the prospective sanitary final disposal site of Adana can be finalised.

A separate personnel list must also be prepared for the rehabilitation activities to be carried at the Sofulu site, as well. Since sanitary landfill and rehabilitation operations will be concurrently undertaken at the Sofulu site for a certain period of time, both activities can be managed together. In this case, a support staff composed of;

- traffic marshals
- vehicle operators for waste and earthmoving, as well as
- manual labourers

size of which is identified in the light of

- i. waste and earth volume handled
- ii. number of work shifts a day
- iii. mechanisation level

would be sufficient.

The daily operations at the landfill site fall generally into three groups of activities; namely, waste reception, waste deposition as well as site maintenance and control.

Waste reception comprises operations as;

- checking vehicles and loads at the site entrance
- segregating wastes and loads
- temporary storage for on-site roads
- registry and record keeping

- on-site traffic control and direction to the working face

Waste deposition encompasses on-site operations, which are;

- waste placement in the working face
- compaction
- excavating cover material
- spreading cover material
- construction of on-site haul roads
- construction of bunds and earthworks

Site maintenance and control embraces mainly supervision and monitoring activities, such as;

- litter and dust control
- maintenance of buildings, fences and plants
- surface water control
- leachate control
- gas and odour control
- vermin and bird control
- environmental monitoring

All these operations have to be carried out within the framework of the Operation Plan as required by the Ministry of Environment in compliance with Solid Wastes Sanitary Landfill Operations Procedures.

d. Sorting and Compost Plants in Adana

There are two options for the management of the operations of sorting and compost plants; either separately or jointly. If these two plants are located at the same site in close physical distance to each other, it would naturally be rational and economic to manage their operations, jointly.

Departing from this point of view, the following staffing has been represented in the table below, where one can distinguish between separate personnel and joint personnel of the compost and sorting plants, alternatively and respectively.

Table 12-1: Staffing of Compost and Sorting Plants in Adana

| Personnel | Compost Plant | Sorting Plant |
|------------------|---------------|---------------|
| Sub-manager | 1 | 1 |
| Accountant | 1 | 1 |
| Secretary | 1 | 1 |
| Supervisor | 4 | 6 |
| Machine operator | 6 | 10 |
| Loader operator | 8 | 2 |
| Labourer | 18 | 42 |
| Driver | 4 | 4 |
| Total | 43 | 67 |

12.1.2 Legislation and Enforcement

The first legal regulation related to solid waste management has been made by the General Public Health Act 1930 and this duty has been given to the municipalities. According to the Greater Municipalities Act 1984, the greater municipalities are obliged to identify the locations, where solid wastes and industrial wastes have to be collected, sorted, recycled and disposed within the overall waste management system. The greater municipalities have been further obliged to set up the necessary sites and plants as well as to operate them, whilst the district municipalities are associated solely with waste collection activities. The greater municipalities and likewise the Adana Greater Municipality are free either to set up and operate recycling plants and final disposal sites by themselves or let them be set up and operated by a certain company on contractual basis.

The municipalities or any other municipally authorised organisations, which are in charge of establishing and operating landfills are legislatively obliged to submit their recent reports to the Ministry of Environment about the status of their SWM activities and current situation of dumpsites, landfills or closed disposal sites. This subject has been made compulsory and binding for the municipalities through the Regulation on Solid Waste Landfill Sites prepared by the Department for the Management of Wastes and Chemicals of the Ministry of Environment and issued in May 1993.

Accordingly, it is also binding for the Adana Greater Municipality, like rest of the municipalities, to meet the requirements and forward necessary documents to the Ministry of Environment in this concern. The Ministry also reminds through the above mentioned regulation that the municipalities have to identify the locations of current dumpsites, disposal sites and landfills in their urban development and landuse plans and prohibit any settlement on these areas 30 years long. A special attention and care have to be devoted by the Adana Greater Municipality to this issue, as well.

For the closure of dumpsites, landfills and final disposal sites, the regulation envisages no final surface coverage to be undertaken without establishing necessary systems required for gas absorption and outlet. In case of omitting any responsibility or obligation stated in above mentioned regulation, the Adana Greater Municipality will be subjected to punishments as indicated in provisions of Article 46.

According to the Regulation on Solid Waste Landfill Sites again, the Adana Greater Municipality is obliged to indicate the location of the closed dumpsites, landfills and final disposal sites on urban development and landuse plans as well as to permit no contraction or settlement on these sites for a time period of 40 years following the closure.

The Adana Greater Municipality is also legally obliged to train personnel engaged in sorting, recycling, composting and disposal practices. Not only vocational training, but a consciousness building on basic environmental protection and public health principles is also legally envisaged.

In the identification of eligible locations to be used for sanitary landfill sites, sorting and compost plants and in making final decision on Sofulu site as well, a series of criteria set forth by the regulation have been met; such as, distance to settlement areas; water resources; underground water movements; geological, geo-technical and

hydrogeological structure; traffic and transportation distance; aesthetics; landfill capacity, etc.

However, there are also some legal liabilities to be accomplished by the sanitary landfill operator during final disposal activities. The sanitary landfill has to be operated in accordance with Solid Waste Sanitary Landfill Operations Procedures as envisaged by the Ministry of Environment. Following the completion of landfill operations and closure of the sanitary disposal site, the monitoring activities must be obeyed 10 years long.

The Amendment on the Regulation for Solid Waste Control issued on September 15th, 1998 declares that the Ministry of Environment is in favour of utilisation of recyclables and assigns the governorates and municipalities to promote and to encourage actions and implementations in this respect. With aid of incentives, these agencies are also supposed to foster use of recycled materials wherever possible.

In order to avail a smooth sorting of wastes, the regulation accentuates that medical wastes, chemicals and radio-active wastes as well as hazardous wastes must be separately disposed. The governorates and municipalities are responsible for the separate disposal of hazardous and medical wastes pursuant to the Regulation for the Control of Hazardous Wastes issued on September 27th, 1995 and Regulation for the Control of Medical Wastes issued on May 20th, 1993, respectively.

The commercial and industrial enterprises producing, importing and selling products in PET, PVC, PE, PS, PP, aluminium, tin, glass, etc. type of recyclable containers are subject to material recovery and must collect a certain portion of their empty containers back. This material recovery action

Based on quota and deposits practices is managed by a commission, which fixes yearly target rates for each enterprise, individually. If the target rates are not achieved by the enterprise, the quota conditions for the following year get harder.

According to the Regulation for Solid Waste Control, the mayors within the municipal boundaries and the governors in rest of the vicinities within the provincial boundaries are obliged to take necessary measures for separate collection or sorting of recyclables in order to ensure a more environmentally sound waste disposal and a more economic utilisation of collected inorganic and organic but recyclable household, commercial, institutional, market and park wastes.

12.1.3 Financial System

a. Problems in the Present Cleansing Tax System

A cleansing tax system was introduced in 1994 in the aim to establish a financial base for the cleansing services. The system is not fully functional, however, due to the following problems.

- Revisions in the cleansing tax tariff are not in accordance with the increase in cleansing service expenses.
- The cleansing tax tariff does not reflect waste discharge characteristics and the taxpayers' ability to pay.

- The number of buildings to be taxed are not fully identified.
- Since the cleansing tax is only standardised by province, the tax amount does not take into account the disparity in municipal cleansing service expenses.
- Since the cleansing tax is imposed by building use, incentives to promote waste volume reduction and separate collection are difficult to establish.

b. Improvement Measures

The introduction of a cleansing tax system by waste amount is one way to solve the aforementioned problems. This would refer to the setting up and collection of a cleansing tax tariff in accordance with the discharge amount. This is not to say, however, that this system is without any problems. The table below compares the advantages and disadvantages of a cleansing tax system by waste amount and a cleansing tax system by building use.

Table 12-2: Advantages and Disadvantages of Cleansing Tax System by Waste Amount and by Building Use

| | Advantages | Disadvantages |
|--------------------------------------|--|--|
| Cleansing Tax System by Waste Amount | <ul style="list-style-type: none"> • Willingness to pay the SWM expenses is clearly determined. • The SWM collection fee may be established by service level. • Imposing taxes by waste amount would enable activities that would encourage waste minimisation. | <ul style="list-style-type: none"> • Waste discharge amount is difficult to measure. • Establishing a tariff that reflects waste discharge characteristics and the peoples ability to pay is difficult. • Cost involved in fee collection can easily rise. • Easily induces illegal dumping. |
| Cleansing Tax System by Building Use | <ul style="list-style-type: none"> • Facilitates establishing of fees. • Cost involved in fee collection becomes cheaper | <ul style="list-style-type: none"> • Establishing a waste collection fee by service level is difficult. • Incentives to promote separate collection and waste minimisation are difficult to promote if collection is by building. |

As in other taxes, the collection of the cleansing tax is compulsory, hence it is generally said that 70 to 80% of the amount is collected. Joining the cleansing tax with the real estate tax is also expected to further increase the rate.

In contrast, it is difficult to make collection compulsory under a direct collection system. If direct collection is carried out in accordance with the waste amount, a weighing system should be established.

From the results of the above studies, this study recommends the restructuring of the cleansing tax system.

c. Actualisation of the Implementation Plan

The factor to be considered first and foremost in the implementation of a financial system is the full utilisation of the advantages of the cleansing tax system introduced. This would mainly refer to the following:

- Establishing an adequate tax tariff
- Raising the collection rate to over 90%

In addition, to promote separate discharge and waste minimisation, specific waste bags should be introduced and a separate fee for bulky discharges should be established to gain public co-operation.

The following points regarding the financial system should be improved to actualise the implementation plan.

- Improvement of cleansing tax collection rate
- Reconsideration of cleansing tax tariff

c.1 Improvement of Cleansing Tax Collection Rate

Aiming for a 90% cleansing tax collection rate would significantly require not only the establishment of a solid financial base, but also the implementation of the beneficiary pays principle. Almost all of the residents discharge their own waste, while nearly all households receive the waste collection, treatment, and disposal services. At present the number of buildings subject to the cleansing tax is not systematically identified. To discourage cleansing tax evasion, cleansing tax should be billed jointly with the real estate tax.

c.2 Reconsideration of Cleansing Tax Tariff

The cleansing tax is reviewed yearly but still is not enough for the ever increasing cleansing service costs. The waste discharge characteristics cannot be reflected in the tax due to the standardisation of the tax tariff. It is, therefore, important to study the discharge conditions in households and offices to adopt a suitable tax tariff. Cross subsidy should also be considered for households.

c.3 Elucidation of Cleansing Service Expenditures

The accounting of various SWM cleansing services are currently not carried out separately. A separate accounting should be carried out in order to clarify how much is being spent on every service.

12.1.4 Privatisation and Contracting System

In fulfilling its legally obligatory services related to recycling and sanitary landfill management, the Adana Greater Municipality like rest of the municipalities, has the right either to undertake these activities by itself, or commission a private entity to undertake them on its behalf. If commissioning an entity is found appropriate and beneficial, this is naturally possible through a privatisation action based on certain contractual provisions.

It is for sure that the Adana Greater Municipality has gained a considerable experience in general aspects of privatisation carried out in diverse service sectors. Relying on this experience;

- Sanitary landfill operations in the Sofulu site
- Rehabilitation operations in the Sofulu site
- Sanitary landfill operations at the prospective site
- Sorting operations at the prospective sanitary landfill site
- Composting operations at the prospective sanitary landfill site

can be contracted to private agencies. There are however a series of legal obligations which deserve due attention in contracting. These legal obligations which have to be of binding character for the contractor are, inter alia;

- Security obligations - physical instalments for the safety of site
- Monitoring and reporting obligations - environmental quality assessments and measurements
- Training obligations - environmental protection and public health measures
- Hygienic obligations – personnel, equipment and vehicle sanitation
- Follow up obligations – monitoring for aftercare measures.

A special care have to be given to above mentioned issues within the contractual framework for judicial reasons without neglecting following issues for professional reasons as well:

- Managerial and operational obligations – tasks and performances,
- Personnel obligations - qualification and size of managerial and operational staff,
- Financial obligations – investment, personnel, operation and maintenance costs and payments,
- Scheduled obligations – timely achievements.

The contracting conditions could be made mutually favourable and beneficial, if the municipality and the contractor agree on a gentleman's protocol for the renewal of their contract , which is legally restricted to 1 year, presently.

12.1.5 Monitoring and Information Management System

A legal enforcement executed by the Ministry of Environment through the Regulation on Solid Waste Landfill Sites requires each municipality or municipally authorised organisation in this respect, to forward to the ministry relevant information on previous and recent status of waste discharge activities as well as current situation of dumpsites, landfills and closed disposal sites. This imperative action must be obeyed by the Adana Greater Municipality, as well. The aim of the Ministry of Environment through this legislative instrument is, at the first glance, to assess leachate and gas

emissions endangering natural and human resources in close surrounding, and followingly, to set up a perpetual monitoring of activities and measures taken in this regard.

The Ministry of Environment emphasises that, the greater municipalities should avail such an information channel in order to put the ministry in a better position to assess the current and potential environmental risks, whereby the locational conditions and disposed waste amount are taken into consideration. This commitment is further important for the ministry to identify necessary measures in currently used and / or previously used but recently closed landfill sites based on analyses related to waste volume, waste composition, locational specifications, geological and hydrogeological structures, etc. The Ministry of Environment asks the municipalities for information exchange and calls for coordination in these issues.

In the light of above explanations, it is obvious that, the operating agency of the sanitary landfill site of Adana has to enter into certain legal commitments with the Ministry of Environment within the framework of an operation plan. This prepared plan must be confirmed by the ministry in respect to its compliance with the Solid Waste Sanitary Landfill Site Operations Procedures. Not only operation regulations and instructions are indicated in this plan, but also a series of monitoring activities. These monitoring requirements, which are basically confined to leachate and gas emissions, must be periodically fulfilled and the results have to be reported to the Ministry of Environment, as well. Therefore a precise list and description of monitoring tasks must be developed, in which specifications related to measuring activities are amply identified along with reporting procedures to be pursued upon evaluations. These obligations necessitate an adequate information system to be structured upon a periodical checklist for an effective monitoring.

Referring to the above mentioned provisions, the Adana Greater Municipality must prepare an operation plan for those sections of the Sofulu site, in which sanitary landfill practices will start. In addition to this plan, another specific document has to be prepared for those sections of the Sofulu site, in which rehabilitation activities will be carried out concurrently. For the prospective sanitary landfill site of Adana, a particular plan has to be prepared for ministerial confirmation, as well. All these operation plans will naturally be associated with monitoring obligations on procedural basis.

Another important subject is the monitoring and control of settlement actions nearby the landfills. The regulation envisages that , currently used waste disposal sites, as indicated in the landuse plans, must not be permitted for any settlement purpose for a time period of 30 years. A similar action is also envisaged for closed dumpsites, which prohibits any settlement over this area for a time period of 40 years following the closure. Those closed dumpsites have to be regularly inspected and monitored by undertaking periodical samples related to gas existence, leachate percolating as well as underground and surface water contamination. Closed sanitary waste disposal sites on the other hand, which is presently a very rare case in Turkey, must be monitored 10 years long following the closure, as mentioned in the regulation.

The consequence to be drawn from these provisions is that, over the Sofulu site no settlement action will be permitted in consecutive 40 years upon its closure. This site will additionally be kept under monitoring throughout this period. Following the

termination of sanitary landfill operations in prospective landfill site in Adana, this site will also be monitored 10 years long.

According to the Regulation on the Solid Waste Landfill Sites 1993 again, it is not sufficient to secure the bottom impermeability of waste storage and outlet for methane gas. Wastes must be adequately laid over and they should therefore be weighted and controlled before being admitted to the site. No domestic or wild animal should be allowed into the fenced sanitary landfill site. The leachate and gas emissions must be regularly assessed and monitored, as well.

Regarding the closure of old dumpsites, it is neither sufficient to cover the surface of stored wastes and establish a functioning gas collection and outlet system. The closed dumpsites must be inspected and controlled continuously. Especially in those closed dumpsites lying nearby the residential areas, methane gas must particularly be measured. On regular monitoring basis; the plant cover over the waste storage, access and entrance roads as well as the gate, surface water drainage, leachate collection systems and gas outlets must be maintained and repaired, if required.

12.1.6 Human Resources Development

In the Regulation on Solid Waste Disposal Sites issued in May 1993, the Ministry of Environment sets forth, that all solid waste management activities of the municipalities should be carried out in association with training. All engaged personnel have to be conscious about and be trained on “environmental protection from cradle to grave” principle.

In compliance with above stated principle, the municipal and private personnel engaged in solid waste management must be mentally well prepared for environmental protection and fulfil the requirements adequately throughout implementations and operations. The Ministry of Environment is in the expectation, as articulated in the regulation, that those individuals working on waste collecting, sorting and storing phases of solid waste management process are obliged to be informed about the risks generated by wastes and must take necessary measures in this regard. Similarly, the manpower working in rehabilitation of old dumpsites must be priorly well trained about the dangers caused by the methane gas. They have to be equipped properly and must know how to take necessary measures, appropriately.

According to the regulation, the personnel working in operational and field services have to wear gloves, protective glasses, boots and special garments. Work garments and equipments as well as vehicles ought to be disinfected and cleaned on periodical basis.

Cleanliness is another prime issue which need to be emphasised by every occasion. The garments worn by the personnel as well as instruments and vehicles used during operations must be cleaned and disinfected. The personnel must get used to cleanliness and learn it from his near social and labour environment.

These provisions require the Adana Greater Municipality to give more efforts on training of personnel on general environmental protection issues, environmental relevance and risks as well as protection regulations and implementations to be pursued throughout their tasks related to solid waste collection, transportation and disposal as well as after care engagements subsequent to closures.

12.1.7 Public Education and Co-operation

a. Promoting Education, Public Awareness and Training

a.1 Initiative for Source Separation

Experimental pilot projects should be carried out as environmental education and co-operation projects, with the following objectives:

- To raise public awareness on SWM issues and change people attitudes towards waste minimisation, recovery and recycling from indifferent to very concerned.
- To introduce public co-operation and participation as a mean of promoting separate waste collection system in the whole city. Awareness of the limitation of natural resources, realise the magnitude of the impacts of human activities on the environment, learning about composting and recycling as a ways to help to reduce the amount of waste being produced.
- To formulate and conduct public education programs on SWM issues through meetings and workshops.

In making the pilot project for public education, it is necessary to select the more appropriate area and materials to get joint participation of the whole area population. In order to achieve the objectives of campaign project the following campaign materials are recommended:

Table 12-3: Education Materials in Adana GM

| Material | Advantages | Disadvantages |
|--------------------------|---|---|
| Printed matters | Repetition effect Re-usability | Little impression |
| Charts and posters | High portability | Limitation of information Not for mass people |
| Overhead projector (OHP) | Can be used in | High cost (projector) Heavy and low mobility |
| Slides | Good for a large number of people Relatively low cost | High cost (projector & development) |
| Sound filmstrips | Good for a large number of people Storey-like explanation | High cost (projector & dark curtain & film making) |
| Use of real examples | Instant explanation with local materials (easy access and high familiarity) | Seasonal and location constraints |
| Radio & television | High impact with repetition effect | High cost |
| Video film | High impact Quick replay | Needed electric facilities High cost (VCR & parts) |

a.2 Reorienting Education towards Sustainable Development

To improve the present SWM problems with the promotion of the independent and positive involvement of the general public for reducing environmental load, it is essential to spur changes in the socio-economic and cultural system.

In order to promote such voluntarily involvement by the general public, it is required to promote public education, and environmental-related learning from the viewpoint of lifelong learning, at greater municipal level, at home, school, and the workplace, so that the various sectors can obtain basic knowledge of relation between human beings and the environment, and so that they can deepen their understanding of the environment and take voluntary action for environmental conservation.

Taking into account the above, Adana GM must attach importance to the implementation of the following activities.

- Adana GM must develop the information base, which is conducive to the environmental education of the general public, and must promote the provision of information through various kinds of media. It should also foster human resources for the promotion of separate collection activities and should develop facilities for environmental learning, etc. Also, in order to improve work for public education by local authorities, Adana GM must promote programs, which has to do with environmental education, in towns and cities.

f.1.3 Promoting Training

To effectively promote measures for separate collection experiment, it is necessary to improve and strengthen systems to carry out these measures by continuously fostering human resources to fulfil the role of such promotion in a well-planned manner.

f.2 Environmental Sound SWM

It is necessary to reduce as much as possible the final amount of waste to be treated in order to minimise waste, by limiting the generation of wastes, promoting the use of recycled resources, and properly disposing of wastes as well as reducing the amount of wastes.

As the issue of waste represents a big problem, which must be solved in order to construct an socio-economic system with reduced environmental load, in addition to limiting the generation of wastes, it will be necessary to reduce waste amounts by promoting the reuse, reduce and recycling of resources.

f.3 Education Program Guideline

Environmental education is given by a number of institutions, organisations and agencies. However, no separate collection system has been globally introduced at the city level and the public is hardly aware of the SWM problems. In order to deepen understanding of the SMW problems and contribute for minimisation and recycling, an education program for the priority projects is guideline consisting of the following elements:

- 1) The present public education system in Adana GM will offer the basis for the education program proposed. No drastic reforms or changes may be applied for the system, since these require extra governmental expenditure and, at the same time, create unwelcome disorder within the system.
- 2) Harmonious co-ordination is required among “formal education programs” and “community-base education programs”. This stabilise the ties between government and private sectors, and encourage sustainable SWM improvement in Adana GM.

- 3) The program should take stepwise deployment onto short, middle and long range targets: the short term program aims to establish a fundamental basement and plays the role of a “booster” for the middle and long term programs off; the middle and long term programs will be an engine of sustainable separate collection improvement.
- 4) Each roles of relate entities and actors should be clarified both in the co-operative program planning and implementation. The program will provide each entity occasions to practice co-operative actions. This may lead a moderate institutional reform in the field of co-operative SMW improvement.

f.4 Key Approach for Sustainable Development

This approach is consisted of three stages, that is, short range, middle range and long range programs.

Short Range Program: targeting the year 2005

This program identified as a booster for taking off the pilot project. It aims to enhance people’s conscious on separate collection system; introduce co-operative scheme on SWM improvement; renovate former useful programs for SWM and community participation, and offer basic knowledge on separate collection.

Middle Range Program: targeting the year 2010

This second stage booster will enforce and expand the basic ideas and strategy in the former stage bridging toward the next program. Review on the short program will be expected to indicate useful lesson in the next stage.

Long Range Program: targeting the year 2020

The final program wills pursuit to review and estimate impacts of the first and second programs, and establish a harmonious sound SWM system with long span sustainability in total.

f.5 Recommendation to Promote Separate Collection System at the Selected Priority Project Area

Most of householders may have interest to participate in the separate waste collection experiment. Some residents, however, will not be able to take part in waste separation activities for a variety of reasons. But most of the people understand that objectives of waste separation contribute for the better environment and the future of its city.

The followings are simple issues to be considered to promote the experiment:

- 1) To discuss the idea with the building representatives and doorkeepers. They are familiar with the buildings, its residents and how waste is collected.
- 2) To find out how garbage is handled now. To verify if each householder required bringing the garbage to a collective waste bin installed at a designated area or floor. If there are containers outside the buildings to store the garbage, etc.
- 3) To determine what composting and recycling opportunities are available in the area?

- 4) Design a separate collection and recycling systems that fits into each situation and area. For example, if each householder places their garbage into a waste bin or container, then set up a separate waste bin and container for organic wastes and recyclable materials, providing instructions on what should and should not go into it.
- 5) To prepare information (e.g., leaflets, pamphlets, etc.) for householders on how the program is to work and why it is important to participate.
- 6) To launch the program using the building representatives, doorkeepers or internal newsletter to broadcast the program.
- 7) Monitor the program to make sure everyone knows how to participate properly and receives information on how well they are doing to encourage their continuous co-operation.
- 8) Adjust the program to take any changes into account.

12.1.8 Guidelines

a. General

The legislative guidelines drawn from currently in force laws envisage the fulfilment of following obligations, in general:

- The management of the Sofulu site has to prepare the compulsory report to be submitted to the Ministry of Environment consisting information on present situation as well as prospective activities and relevant measures to be undertaken for the rehabilitation of the present disposal site along with design concepts of a sorting plant, a compost plant and a final disposal site.
- Currently used final waste disposal sites as well as those closed must be indicated in urban development and landuse plans and on settlement action have to be permitted for those areas for the coming 30 and 40 years, respectively.
- Prior to surface coverage of closed dumpsites, necessary steps have to be undertaken for establishing a system required for gas absorption and outlet. The closed landfills must be periodically inspected and monitored.
- Garments worn by the personnel as well as the equipment and vehicles used throughout operations must be cleaned and disinfected regularly.

Supplementary to preceding legal obligations, following guidelines have to be precisely pursued for purposeful and efficient management of the sanitary landfill site as well as sorting and compost plants. At initial stage, a competent manager can be in charge of rehabilitation and sanitary landfill at Sofulu site. At consecutive stages, the responsibility of the landfill manager can either be extended to the management of the new sanitary landfill site as well as sorting and compost plants or another manager can independently be employed to be in charge of new sorting and compost plants. The manager(s) must be contractually responsible to and supervised by the Cleansing Department of the Adana Greater Municipality.

b. Prime Operational Guidelines

- In the short run, the operation plan should be developed to guide sanitary landfill and rehabilitation activities in the Sofulu site, whilst in the medium run, the operation plan should be worked out to guide sanitary landfill, sorting and compost activities at the prospective disposal site of Adana.
- At investments decision stage about the type of landfill equipment needed, following criteria should be referred:
 - functions related to soil (excavation, handling, compaction),
 - functions related to wastes (handling, compaction),
 - support functions (handling, spreading, covering)along with systematic inspection and maintenance.
- At operation stages of the sanitary disposal, following steps need to be carefully pursued:
 - access control at gatehouse for control and record of details pertaining to each load and on-site orientation of vehicles for safe discharge (unloading),
 - waste placement by a tracked bulldozer in compliance with adopted storage techniques (working faces, cells) and compacting in accordance with envisaged material stratification system by applying appropriate layering operation (spread into thin layers),
 - application of soil cover regularly, preferably on daily basis (compact waste),
 - application of intermediate covers for unregular landfilling, final covers for completed landfilling and cell construction with sidewalks for new landfilling (cover waste).
- Throughout the operations, following duties have to be performed by aid of appropriate control mechanisms:
 - surface water management by perimeter and temporary drainage ditches and channels including inspecting, cleaning and maintaining,
 - fire control with diverse techniques applied actively and reactively,
 - pest control for avoiding public health risks,
 - litter control, particularly on windy days.
- Throughout the operations following duties have to be performed by aid of appropriate monitoring mechanisms:
 - leachate control and monitoring to keep clean surface and underground water separated from the waste,
 - gas control and monitoring to avoid a potential risk created by flammable concentrations in the site.

- For proficient management of operations, a precise record-keeping is required composed of:
 - equipment maintenance records – a complete life story of each piece of landfill equipment,
 - daily operational records – daily waste input received and placed as well as quantity of material used and time spent by machines and manual staff,
 - environmental monitoring records – gas emission and water quality assessments,
 - personnel records – employment details of manpower,
 - financial records – expenditures and revenues, budgets for prospective operations and investments.
- Throughout operations on the landfill site, a particular attention has to be paid for taking necessary measures related to occupational and environmental health. The essential items to be pursued for safe and healthy operations at the site are:
 - Informing and training the personnel on;
 - i. potential hazards associated with the activity,
 - ii. safety precautions / personal protection equipment,
 - iii. emergency procedures / medical assistance,
 - vi. system for safe work practices,
 - Instructing operators on specified system of work / personal hygiene and vehicular sanitation care,
 - Following a regular maintenance program for physical instalments against dangerous occurrences.

c. Prime Managerial Guidelines

For the fulfilment of above mentioned duties, the tasks and responsibilities of the landfill manager and the deputy manager / supervisor must be identified within the framework of a certain division of labour as indicated below. The landfill manager and the deputy manager / supervisor will be functioning as the contracted subordinates of the Cleansing Department of the Greater Adana Municipality.

Landfill manager: responsible for all matters concerned with the development, operation and completion of the landfill in accordance with operations plan. Primary duties include the following:

- planning of human, technical and financial resources for the proper operation and maintenance of the landfill, as well as
- preparation of forecasts for consideration of the Cleansing Department of the Adana Greater Municipality,
- fulfilment of current and prospective requirements of the operations plans as approved by the Cleansing Department of the Adana Greater Municipality,

- recruitment of staff and procurement of equipment and materials within approved budgets to operate and maintain the landfill,
- development of detailed health and safety plan, emergency plan and environmental monitoring plan as extensions of the operations plan,
- assignment of tasks to site staff,
- training of the site staff,
- instruction of landfill supervisor on site operations and on environmental monitoring,
- review of daily and weekly reports prepared by the supervisor and others on site activities,
- preparation of monthly, quarterly and annual management information reports,
- salary payments as well as equipment and material purchases.

Deputy manager / operations supervisor: responsible for the daily activities on the landfill site in accordance with instructions received from the manager. Primary duties include the following:

- supervision of labour to control admission of wastes, movement of vehicles within the site, tipping in approved areas, compaction and covering of tipped waste,
- maintenance and supervisions of plants and vehicles,
- winning borrow material for use as daily, intermediate or final cover and stockpiling of cover material,
- supervision of housekeeping activities on site carried out by non-technical staff,
- preparation of daily and weekly activity reports,
- reporting to the manager any problem related to personnel, equipment, material, wastes inputs and public complaints.

12.2 For Cimsa Site Development

12.2.1 Administration and Organisation

a. General

The Ministry of Environment complains in general that; while solid waste collection activities are more or less successfully carried out by the district municipalities, unfortunately the greater municipalities have failed to a large extent in accomplishing their duties related to recycling and sanitary landfilling. The Mersin Greater Municipality should be now in the position to get rid of such an image in the views of the Ministry of Environment and realise an exemplary planning action with respective operations. These attempts must be models for ministerial extension services and give an impulse for similar attempts in other greater municipalities.

Each municipality or any other municipally authorised agency dealing with dumping, landfilling and final waste disposal have to fulfil certain administrative obligations and regularly inform the Ministry of Environment about their previous and on-going activities in this regard. This obligation serves for the purpose that; the Ministry of Environment firstly gets acquainted with the current landfill practices in municipal areas, and secondly, be informed about prospective activities which need to be evaluated, oriented and formally controlled.

Likewise, the Mersin Greater Municipality should also inform the Ministry of Environment on its contemplations regarding the further use of the present site in the short run and subsequently its closure. This administrative duty is also valid for the identification of location for the new sanitary landfill in Cimsa site, at which sorting and compost plants will also take place. It has to be substantially justified that those decisions are made in accordance with a series of criteria as set forth by respective regulations of the Ministry of Environment. The related decision process must be adequately followed in this regard.

The Mersin Greater Municipality is aware of the fact that, necessary formal procedures must be fulfilled by respective municipalities in Turkey to allocate the disposal sites in the urban development and landuse plans and precisely indicate whether they are currently used or closed. As legally envisaged, these areas are prohibited to settlement actions, and this issue has to be adequately pursued throughout the decision and enforcement process running under the initiative of the municipal councils and municipal parliaments. The prohibit duration is 30 years for present landfill sites and 40 years for closed landfill sites. It is also a compulsory administrative duty of the Mersin Greater Municipality to obey these judicial provisions, which are in close connection with prospective activities in solid waste management.

In fact, currently used dumpsite and the prospective sanitary disposal site in Cimsa area have been adequately identified in urban development and landuse plans of Mersin. However, contradictory actions and amendment initiatives by some local authorities and interest groups have been started, which do not reveal suitable behaviour and lack sufficient substantiations. All responsible agencies have to accept official decisions; in other words, officially justified and confirmed decisions. Moreover, these agencies have to regard the implementation of official decisions as administrative obligations.

In compliance with prospective activities, administrative liabilities must be identified and organisational schemes must be developed for;

- Rehabilitation of the present disposal site in Mersin,
- Operation of a new sanitary landfill at Cimsa site as well as
- Operation of a new sorting plant and
- Operation of a new compost plant.

b. Rehabilitation of the Present Disposal Site in Mersin

It falls under the responsibility of the Mersin Greater Municipality to look after the fulfilment of managerial and operational requirements as well as technical provisions and specifications, as set forth in respective regulations and instructions of the Ministry of Environment, related to sanitary landfill management. While layering the

new wastes by taking necessary measures and meeting requirements of a sanitary waste disposal practice, the Mersin Greater Municipality should also provide the appropriate network for gas absorption and leachate collection along with adequate outlet systems prior to laying a surface cover for closure.

According to regulations, the final disposal sites have to be surrounded by fence. Entrances to and departures from the site have to be supervised and controlled. A guard cottage should be constructed along with an operation room and a weighbridge. All these requirements are met in Mersin, however more importance need to be attached in order to ensure a serious and proper management and service.

Those private and municipal agencies or corporate entities, which are responsible for the operation of final disposal site, should legally employ a technician, who has to be in charge of the control of wastes entering into the site as well as of landfilling operations within the site. The operator agency of the disposal site is obliged to prepare an operation plan in compliance with Solid Waste Sanitary Landfill Operations Procedures as developed by the Ministry of Environment. Within the framework of this operation plan, certain monitoring activities must be carried out; primarily, leachate and gas emissions, and the results of periodical measurements must be forwarded to the Ministry of Environment, if required. These measuring and monitoring obligations are valid for the following 10 years upon the termination of the sanitary landfill operations and closure of the site.

There are also some subsidiary legal obligations pertaining to two main concerns. One of them is the training of personnel on environmental risks and the other one is the applications of requirements for cleanliness in working place. The training of personnel on environmental protection practices is not only necessary for himself, but also for the welfare of his human and natural environment, as well. The workers should be sufficiently informed about the risks of their occupational engagement and be trained about protection measures on the job. Sanitation and disinfection of work garments, equipment and vehicles constitute a significant duty to be taken up, respectively. Trucks and excavators operating in the landfill site must be cleaned before leaving the site. The municipal administration is in this regard legally instructed to look after the prompt loyalty to training and sanitation requirements by the contractor or other assigned agency. This principle naturally applies for the landfill operations of the Mersin Greater Municipality, as well.

c. Sanitary Landfilling in Cimsa Site

In the management and operation of a sanitary landfill site, the minimum level of staffing varies, depending on the quantity of waste received as well as the method applied in landfilling operations. For those landfill sites with a capacity over 250 ton per day, where waste is placed and compacted by machines, a reasonable staffing should include the following personnel:

| Personnel and heavy vehicle | Number |
|-----------------------------|----------------------|
| <u>Personnel</u> | |
| Site Manager | 1 person (2002-2005) |
| Waste controller | 1 person (2002-2005) |
| Operator | 4 person (2002-2005) |
| Driver | 3 person (2002-2005) |
| Worker | 2 person |
| Security guard | 2 person |
| Total | 13 (2002-2005) |

In identification of the definitive personnel size, mainly three criteria have to be referred:

- i. waste volume handled
- ii. number of work shifts a day
- iii. mechanisation level

Thereafter the personnel size needed for sanitary landfilling operations at Cimsa site can be finalised.

The daily operations at the landfill site fall generally into three groups of activities; namely, waste reception, waste deposition as well as site maintenance and control.

Waste reception comprises operations as;

- checking vehicles and loads at the site entrance
- segregating wastes and loads
- temporary storage for on-site roads
- registry and record keeping
- on-site traffic control and direction to the working face

Waste deposition encompasses on-site operations, which are;

- waste placement in the working face
- compaction
- excavating cover material
- spreading cover material
- construction of on-site haul roads
- construction of bunds and earthworks

Site maintenance and control embraces mainly supervision and monitoring activities, such as;

- litter and dust control
- maintenance of buildings, fences and plants
- surface water control
- leachate control
- gas and odour control
- vermin and bird control
- environmental monitoring

All these operations have to be carried out within the framework of the Operation Plan as required by the Ministry of Environment in compliance with Solid Wastes Sanitary Landfill Operations Procedures.

d. Rehabilitation of the Present Disposal Site in Mersin

A separate personnel list must also be prepared for the rehabilitation activities to be carried at the present final disposal site in Mersin upon the initiation of sanitary landfill operations at Cimsa site. A reasonable rehabilitation staffing level may well include:

- A rehabilitation manager based at the site
- A deputy manager or supervisor
- A gate keeper and security guards
- A clerk
- Traffic marshals directing vehicles in the site
- Vehicle operators for landfill and earthmoving
- A maintenance mechanic
- 4 manual labourers per shift

The size of the staff can be identified in the light of

- i. definitive waste and earth volume to be handled daily
- ii. number of work shifts a day
- iii. mechanisation level, as well

e. Sorting and Compost Plants at Cimsa Site

There are two options for the management of the operations of sorting and compost plants; either separately or jointly. If these two plants are located at the same site in close physical distance to each other, it would naturally be rational and economic to manage their operations, jointly.

Departing from this point of view, the following staffing has been represented in the table below, where one can distinguish between separate personnel and joint personnel of the compost and sorting plants, alternatively and respectively.

Table 12-4: Staffing of Compost and Sorting Plants at Cimsa Site

| Personnel | Compost Plant | Sorting Plant |
|------------------|---------------|---------------|
| Sub-manager | 1 | 1 |
| Accountant | 1 | 1 |
| Secretary | 1 | 1 |
| Supervisor | 2 | 3 |
| Machine operator | 3 | 5 |
| Loader operator | 5 | 2 |
| Labourer | 10 | 22 |
| Driver | 2 | 2 |
| Total | 25 | 37 |

12.2.2 Legislation and Enforcement

The first legal regulation related to solid waste management has been made by the General Public Health Act 1930 and this duty has been given to the municipalities. According to the Greater Municipalities Act 1984, the greater municipalities are obliged to identify the locations, where solid wastes and industrial wastes have to be collected, sorted, recycled and disposed within the overall waste management system. The greater municipalities have been further obliged to set up the necessary sites and plants as well as to operate them, whilst the district municipalities are associated solely with waste collection activities. The greater municipalities and likewise the Mersin Greater Municipality are free either to set up and operate recycling plants and final disposal sites by themselves or let them be set up and operated by a certain company on contractual basis.

The municipalities or any other municipally authorised organisations, which are in charge of establishing and operating landfills are legislatively obliged to submit their recent reports to the Ministry of Environment about the status of their SWM activities and current situation of dumpsites, landfills or closed disposal sites. This subject has been made compulsory and binding for the municipalities through the Regulation on Solid Waste Landfill Sites prepared by the Department for the Management of Wastes and Chemicals of the Ministry of Environment and issued in May 1993.

Accordingly, it is also binding for the Mersin Greater Municipality, like rest of the municipalities, to meet the requirements and forward necessary documents to the Ministry of Environment in this concern. The Ministry also reminds through the above mentioned regulation that the municipalities have to identify the locations of current dumpsites, disposal sites and landfills in their urban development and landuse plans and prohibit any settlement on these areas 30 years long. A special attention and care have to be devoted by the Mersin Greater Municipality to this issue, as well.

For the closure of dumpsites, landfills and final disposal sites, the regulation envisages no final surface coverage to be undertaken without establishing necessary systems required for gas absorption and outlet. In case of omitting any responsibility or obligation stated in above mentioned regulation, the Mersin Greater Municipality will be subjected to punishments as indicated in provisions of Article 46.

According to the Regulation on Solid Waste Landfill Sites again, the Mersin Greater Municipality is obliged to indicate the location of the closed dumpsites, landfills and final disposal sites on urban development and landuse plans as well as to permit no contraction or settlement on these sites for a time period of 40 years following the closure.

The Mersin Greater Municipality is also legally obliged to train personnel engaged in sorting, recycling, composting and disposal practices. Not only vocational training, but a consciousness building on basic environmental protection and public health principles is also legally envisaged.

In the identification of eligible locations to be used for sanitary landfill sites, sorting and compost plants and in making final decision on Cimsa site as well, a series of criteria set forth by the regulation have been met; such as, distance to settlement areas; water resources; underground water movements; geological, geo-technical and

hydrogeological structure; traffic and transportation distance; aesthetics; landfill capacity, etc.

However, there are also some legal liabilities to be accomplished by the sanitary landfill operator during final disposal activities. The sanitary landfill has to be operated in accordance with Solid Waste Sanitary Landfill Operations Procedures as envisaged by the Ministry of Environment. Following the completion of landfill operations and closure of the sanitary disposal site, the monitoring activities must be obeyed 10 years long.

The Amendment on the Regulation for Solid Waste Control issued on September 15th, 1998 declares that the Ministry of Environment is in favour of utilisation of recyclables and assigns the governorates and municipalities to promote and to encourage actions and implementations in this respect. With aid of incentives, these agencies are also supposed to foster use of recycled materials wherever possible.

In order to avail a smooth sorting of wastes, the regulation accentuates that medical wastes, chemicals and radio-active wastes as well as hazardous wastes must be separately disposed. The governorates and municipalities are responsible for the separate disposal of hazardous and medical wastes pursuant to the Regulation for the Control of Hazardous Wastes issued on September 27th, 1995 and Regulation for the Control of Medical Wastes issued on May 20th, 1993, respectively.

The commercial and industrial enterprises producing, importing and selling products in PET, PVC, PE, PS, PP, aluminium, tin, glass, etc. type of recyclable containers are subject to material recovery and must collect a certain portion of their empty containers back. This material recovery action based on quota and deposits practices is managed by a commission, which fixes yearly target rates for each enterprise, individually. If the target rates are not achieved by the enterprise, the quota conditions for the following year get harder.

According to the Regulation for Solid Waste Control, the mayors within the municipal boundaries and the governors in rest of the vicinities within the provincial boundaries are obliged to take necessary measures for separate collection or sorting of recyclables in order to ensure a more environmentally sound waste disposal and a more economic utilisation of collected inorganic and organic but recyclable household, commercial, institutional, market and park wastes.

12.2.3 Financial System

a. Problems in the Present Cleansing Tax System

A cleansing tax system was introduced in 1994 in the aim to establish a financial base for the cleansing services. The system is not fully functional, however, due to the following problems.

- Revisions in the cleansing tax tariff are not in accordance with the increase in cleansing service expenses.
- The cleansing tax tariff does not reflect waste discharge characteristics and the taxpayers' ability to pay.
- The number of buildings to be taxed are not fully identified.

- Since the cleansing tax is only standardised by province, the tax amount does not take into account the disparity in municipal cleansing service expenses.
- Since the cleansing tax is imposed by building use, incentives to promote waste volume reduction and separate collection are difficult to establish.

b. Improvement Measures

The introduction of a cleansing tax system by waste amount is one way to solve the aforementioned problems. This would refer to the setting up and collection of a cleansing tax tariff in accordance with the discharge amount. This is not to say, however, that this system is without any problems. The table below compares the advantages and disadvantages of a cleansing tax system by waste amount and a cleansing tax system by building use.

Table 12-5: Advantages and Disadvantages of Cleansing Tax System by Waste Amount and by Building Use in Mersin GM

| | Advantages | Disadvantages |
|--------------------------------------|--|--|
| Cleansing Tax System by Waste Amount | <ul style="list-style-type: none"> • Willingness to pay the SWM expenses is clearly determined. • The SWM collection fee may be established by service level. • Imposing taxes by waste amount would enable activities that would encourage waste minimisation. | <ul style="list-style-type: none"> • Waste discharge amount is difficult to measure. • Establishing a tariff that reflects waste discharge characteristics and the peoples ability to pay is difficult. • Cost involved in fee collection can easily rise. • Easily induces illegal dumping. |
| Cleansing Tax System by Building Use | <ul style="list-style-type: none"> • Facilitates establishing of fees. • Cost involved in fee collection becomes cheaper | <ul style="list-style-type: none"> • Establishing a waste collection fee by service level is difficult. • Incentives to promote separate collection and waste minimisation are difficult to promote if collection is by building. |

As in other taxes, the collection of the cleansing tax is compulsory, hence it is generally said that 70 to 80% of the amount is collected. Joining the cleansing tax with the real estate tax is also expected to further increase the rate.

In contrast, it is difficult to make collection compulsory under a direct collection system. If direct collection is carried out in accordance with the waste amount, a weighing system should be established.

From the results of the above studies, this study recommends the restructuring of the cleansing tax system.

c. Actualisation of the Implementation Plan

The factor to be considered first and foremost in the implementation of a financial system is the full utilisation of the advantages of the cleansing tax system introduced. This would mainly refer to the following:

- Establishing an adequate tax tariff
- Raising the collection rate to over 90%

In addition, to promote separate discharge and waste minimisation, specific waste bags should be introduced and a separate fee for bulky discharges should be established to gain public co-operation.

The following points regarding the financial system should be improved to actualise the implementation plan.

- Improvement of cleansing tax collection rate
- Reconsideration of cleansing tax tariff

c.1 Improvement of Cleansing Tax Collection Rate

Aiming for a 90% cleansing tax collection rate would significantly require not only the establishment of a solid financial base, but also the implementation of the beneficiary pays principle. Almost all of the residents discharge their own waste, while nearly all households receive the waste collection, treatment, and disposal services. At present the number of buildings subject to the cleansing tax is not systematically identified. To discourage cleansing tax evasion, cleansing tax should be billed jointly with the real estate tax.

c.2 Reconsideration of Cleansing Tax Tariff

The cleansing tax is reviewed yearly but still is not enough for the ever increasing cleansing service costs. The waste discharge characteristics cannot be reflected in the tax due to the standardisation of the tax tariff. It is, therefore, important to study the discharge conditions in households and offices to adopt a suitable tax tariff. Cross subsidy should also be considered for households.

c.3 Elucidation of Cleansing Service Expenditures

The accounting of various SWM cleansing services are currently not carried out separately. A separate accounting should be carried out in order to clarify how much is being spent on every service.

12.2.4 Privatisation and Contracting System

In fulfilling its legally obligatory services related to recycling and sanitary landfill management, the Adana Greater Municipality like rest of the municipalities, has the right either to undertake these activities by itself, or commission a private entity to undertake them on its behalf. If commissioning an entity is found appropriate and beneficial, this is naturally possible through a privatisation action based on certain contractual provisions.

It is for sure that the Mersin Greater Municipality has gained a considerable experience in general aspects of privatisation. Relying on this experience;

- Betterment of composting operations at the present disposal site
- Rehabilitation operations in the present disposal site
- Prospective sanitary landfill operations in the Cimsa site

- Sorting operations at the prospective sanitary landfill site
- Composting operations at the prospective sanitary landfill site

can be contracted to private agencies. There are however a series of legal obligations which deserve due attention in contracting. These legal obligations which have to be of binding character for the contractor are, inter alia;

- Security obligations - physical instalments for the safety of site
- Monitoring and reporting obligations - environmental quality assessments and measurings
- Training obligations - environmental protection and public health measures
- Hygienic obligations – personnel, equipment and vehicle sanitation
- Follow up obligations – monitoring for after care measures

A special care have to be given to above mentioned issues within the contractual framework for judicial reasons without neglecting following issues for professional reasons, as well:

- Managerial and operational obligations – tasks and performances
- Personnel obligations - qualification and size of managerial and operational staff
- Financial obligations – investment, personnel, operation and maintenance costs and payments
- Scheduled obligations – timely achievements

The contracting conditions could be made mutually favourable and beneficial, if the municipality and the contractor agree on a gentleman's protocol for the renewal of their contract, which is legally restricted to 1 year, presently.

12.2.5 Monitoring and Information Management System

A legal enforcement executed by the Ministry of Environment through the Regulation on Solid Waste Landfill Sites requires each municipality or municipally authorised organisation in this respect, to forward to the ministry relevant information on previous and recent status of waste discharge activities as well as current situation of dumpsites, landfills and closed disposal sites. This imperative action must be obeyed by the Mersin Greater Municipality, as well. The aim of the Ministry of Environment through this legislative instrument is, at the first glance, to assess leachate and gas emissions endangering natural and human resources in close surrounding, and followingly, to set up a perpetual monitoring of activities and measures taken in this regard.

The Ministry of Environment emphasises that, the greater municipalities should avail such an information channel in order to put the ministry in a better position to assess the current and potential environmental risks, whereby the locational conditions and disposed waste amount are taken into consideration. This commitment is further important for the ministry to identify necessary measures in currently used and / or previously used but recently closed landfill sites based on analyses related to waste volume, waste composition, locational specifications, geological and hydrogeological structures, etc. The Ministry of Environment asks the municipalities for information exchange and calls for coordination in these issues.

In the light of above explanations, it is obvious that, the operating agency of the sanitary landfill site of Mersin has to enter into certain legal commitments with the Ministry of Environment within the framework of an operation plan. This prepared plan must be confirmed by the ministry in respect to its compliance with the Solid Waste Sanitary Landfill Site Operations Procedures. Not only operation regulations and instructions are indicated in this plan, but also a series of monitoring activities. These monitoring requirements, which are basically confined to leachate and gas emissions, must be periodically fulfilled and the results have to be reported to the Ministry of Environment, as well. Therefore a precise list and description of monitoring tasks must be developed, in which specifications related to measuring activities are amply identified along with reporting procedures to be pursued upon evaluations. These obligations necessitate an adequate information system to be structured upon a periodical checklist for an effective monitoring.

Referring to the above mentioned provisions, the Mersin Greater Municipality must prepare an operation plan for Cimsa site, in which sanitary landfill practices will start. In addition to this plan, another specific document has to be prepared for present disposal site, in which rehabilitation activities will be carried out. All these operation plans will naturally be associated with monitoring obligations on procedural basis.

Another important subject is the monitoring and control of settlement actions nearby the landfills. The regulation envisages that , currently used waste disposal sites, as indicated in the landuse plans, must not be permitted for any settlement purpose for a time period of 30 years. A similar action is also envisaged for closed dumpsites, which prohibits any settlement over this area for a time period of 40 years following the closure. Those closed dumpsites have to be regularly inspected and monitored by undertaking periodical samples related to gas existence, leachate percolating as well as underground and surface water contamination. Closed sanitary waste disposal sites on the other hand, which is presently a very rare case in Turkey, must be monitored 10 years long following the closure, as mentioned in the regulation.

From the locational standpoint, the Cimsa site possesses such physical assets, which does not favour any settlement intention in long run. However, the present compost plant and waste disposal site in Mersin, in which operations are ought to be terminated in short run, must be cautiously rehabilitated and nearby settlement structure must be effectively preserved.

The consequence to be drawn from legal provisions is that, over the present compost and waste disposal site, no settlement action will be permitted in consecutive 40 years upon its closure. This site will additionally be kept under monitoring throughout this period. Following the termination of sanitary landfill operations in prospective Cimsa landfill site in Mersin, this site will also be monitored 10 years long.

According to the Regulation on the Solid Waste Landfill Sites 1993 again, it is not sufficient to secure the bottom impermeability of waste storage and outlet for methane gas. Wastes must be adequately laid over and they should therefore be weighted and controlled before being admitted to the site. No domestic or wild animal should be allowed into the fenced sanitary landfill site. The leachate and gas emissions must be regularly assessed and monitored, as well.

Regarding the closure of old dumpsites, it is neither sufficient to cover the surface of stored wastes and establish a functioning gas collection and outlet system. The closed

dumpsites must be inspected and controlled continuously. Especially in those closed dumpsites lying nearby the residential areas, methane gas must particularly be measured. On regular monitoring basis; the plant cover over the waste storage, access and entrance roads as well as the gate, surface water drainage, leachate collection systems and gas outlets must be maintained and repaired, if required.

12.2.6 Human Resources Development

In the Regulation on Solid Waste Disposal Sites issued in May 1993, the Ministry of Environment sets forth, that all solid waste management activities of the municipalities should be carried out in association with training. All engaged personnel have to be conscious about and be trained on “environmental protection from cradle to grave” principle.

In compliance with above stated principle, the municipal and private personnel engaged in solid waste management must be mentally well prepared for environmental protection and fulfil the requirements adequately throughout implementations and operations. The Ministry of Environment is in the expectation, as articulated in the regulation, that those individuals working on waste collecting, sorting and storing phases of solid waste management process are obliged to be informed about the risks generated by wastes and must take necessary measures in this regard. Similarly, the manpower working in rehabilitation of old dumpsites must be priority well trained about the dangers caused by the methane gas. They have to be equipped properly and must know how to take necessary measures, appropriately.

According to the regulation, the personnel working in operational and field services have to wear gloves, protective glasses, boots and special garments. Work garments and equipments as well as vehicles ought to be disinfected and cleaned on periodical basis.

Cleanliness is another prime issue which need to be emphasised by every occasion. The garments worn by the personnel as well as instruments and vehicles used during operations must be cleaned and disinfected. The personnel must get used to cleanliness and learn it from his near social and labour environment.

These provisions require the Mersin Greater Municipality to give more efforts on training of personnel on general environmental protection issues, environmental relevance and risks as well as protection regulations and implementations to be pursued throughout their tasks related to solid waste collection, transportation and disposal as well as after care engagements subsequent to closures.

12.2.7 Public Education and Co-operation

a. Promoting Education, Public Awareness and Training

a.1 Initiative for Source Separation

Continuous experimental pilot projects should be carried out as environmental education and co-operation projects, with the following objectives:

- To raise public awareness on SWM issues and change people attitudes towards waste minimisation, recovery and recycling from indifferent to very concerned.

- To ask public co-operation for waste separation at source (compostable and non-compostable wastes) in order to improve the quality of compost product in the existing and future composting plants.
- To introduce public co-operation and participation as a mean of promoting separate waste collection system in the whole city. Awareness of the limitation of natural resources, realise the magnitude of the impacts of human activities on the environment, learning about composting and recycling as a ways to help to reduce the amount of waste being produced.
- To formulate and conduct public education programs on SWM issues through meetings and workshops.

In making the pilot project for public education, it is necessary to select the more appropriate area and materials to get joint participation of the whole area population. In order to achieve the objectives of campaign project the following campaign materials are recommended:

Table 12-6: Education Materials in Mersin GM

| Material | Advantages | Disadvantages |
|--------------------------|---|---|
| Printed matters | Repetition effect Re-usability | Little impression |
| Charts and posters | High portability | Limitation of information Not for mass people |
| Overhead projector (OHP) | Can be used in | High cost (projector) Heavy and low mobility |
| Slides | Good for a large number of people Relatively low cost | High cost (projector & development) |
| Sound filmstrips | Good for a large number of people Storey-like explanation | High cost (projector & dark curtain & film making) |
| Use of real examples | Instant explanation with local materials (easy access and high familiarity) | Seasonal and location constraints |
| Radio & television | High impact with repetition effect | High cost |
| Video film | High impact Quick replay | Needed electric facilities High cost (VCR & parts) |

a.2 Reorienting Education towards Sustainable Development

To improve the present SWM problems with the promotion of the independent and positive involvement of the general public for reducing environmental load, it is essential to spur changes in the socio-economic and cultural system.

In order to promote such voluntarily involvement by the general public, it is required to promote public education, and environmental-related learning from the viewpoint of lifelong learning, at greater municipal level, at home, school, and the workplace, so that the various sectors can obtain basic knowledge of relation between human beings and the environment, and so that they can deepen their understanding of the environment and take voluntary action for environmental conservation.

Taking into account the above, Mersin GM must attach importance to the implementation of the following activities.

- Mersin GM must develop the information base, which is conducive to the environmental education of the general public, and must promote the provision of information through various kinds of media. It should also foster human resources for the promotion of separate collection activities and should develop facilities for environmental learning, etc. Also, in order to improve work for public education by local authorities, Mersin GM must promote programs, which has to do with environmental education, in towns and cities.

a.3 Promoting Training

To effectively promote measures for separate collection experiment, it is necessary to improve and strengthen systems to carry out these measures by continuously fostering human resources to fulfil the role of such promotion in a well-planned manner.

b. Environmental Sound SWM

It is necessary to reduce as much as possible the final amount of waste to be treated in order to minimise waste, by limiting the generation of wastes, promoting the use of recycled resources, and properly disposing of wastes as well as reducing the amount of wastes.

As mentioned in Section 5.4, the main objectives of public education program in Mersin are to introduce a separate collection and promote the reduction of wastes and resources recovery.

As the issue of waste represents a big problem, which must be solved in order to construct a socio-economic system with reduced environmental load, in addition to limiting the generation of wastes, it will be necessary to reduce waste amount by promoting the reuse, reduce and recycling of resources.

c. Education Program Guideline

Environmental education is given by a number of institutions, organisations and agencies. However, no separate collection system has been globally introduced at the city level (except the experiment on separate collection carried out in GSHC) and the public is hardly aware of the SWM problems. In order to deepen understanding of the SMW problems and contribute for minimisation and recycling, an education program for the priority projects is guideline consisting of the following elements:

- 1) The present public education system in Mersin GM will offer the basis for the education program proposed. No drastic reforms or changes may be applied for the system, since these require extra governmental expenditure and, at the same time, create unwelcome disorder within the system.
- 2) Harmonious co-ordination is required among “formal education programs” and “community-base education programs”. This stabilise the ties between government and private sectors, and encourage sustainable SWM improvement in Mersin GM.
- 3) The program should take stepwise deployment onto short, middle and long range targets: the short term program aims to establish a fundamental

basement and plays the role of a “booster” for the middle and long term programs off; the middle and long term programs will be an engine of sustainable separate collection improvement.

- 4) Each roles of relate entities and actors should be clarified both in the co-operative program planning and implementation. The program will provide each entity occasions to practice co-operative actions. This may lead a moderate institutional reform in the field of co-operative SMW improvement.

d. Key Approach for Sustainable Development

This approach is consisted of three stages, that is, short range, middle range and long range programs.

Short Range Program: targeting the year 2005

This program identified as a booster for taking off the pilot project. It aims to enhance people’s conscious on separate collection system; introduce co-operative scheme on SWM improvement; renovate former useful programs for SWM and community participation, and offer basic knowledge on separate collection.

Middle Range Program: targeting the year 2010

This second stage booster will enforce and expand the basic ideas and strategy in the former stage bridging toward the next program. Review on the short program will be expected to indicate useful lesson in the next stage.

Long Range Program: targeting the year 2020

The final program wills pursuit to review and estimate impacts of the first and second programs, and establish a harmonious sound SWM system with long span sustainability in total.

e. Recommendation to Promote Separate Collection System at a Housing Complex in the Selected Priority Project Area

Most of householders in the housing complex may have interest to participate in the separate waste collection experiment. Some apartment dwellers, however, will not be able to take part in waste separation activities for a variety of reasons. But most of the people understand that objectives of waste separation contribute for the better environment and the future of its city.

The followings are simple issues to be considered to promote the experiment:

- 1) To discuss the idea with the building representatives and doorkeepers. They are familiar with the buildings, its tenants and how waste is collected.
- 2) To find out how garbage is handled now. To verify if each householder required bringing the garbage to a collective waste bin installed on each floor. If there are containers outside the buildings to store the garbage, etc.
- 3) To determine what composting and recycling opportunities are available in the area?

- 4) Design a separate collection and recycling systems that fits into each situation and area. For example, if each tenant places their garbage into a waste bin or container, then set up a separate waste bin and container for organic wastes and recyclable materials, providing instructions on what should and should not go into it.
- 5) To prepare information (e.g., leaflets, pamphlets, etc.) for householders on how the program is to work and why it is important to participate.
- 6) To launch the program using the building representatives, doorkeepers or internal newsletter to broadcast the program.
- 7) Monitor the program to make sure everyone knows how to participate properly and receives information on how well they are doing to encourage their continuous co-operation.

Adjust the program to take any changes into account.

12.2.8 Guidelines

a. General

The legislative guidelines drawn from currently in force laws envisage the fulfilment of following obligations, in general:

- The management of the Cimsa site has to prepare the compulsory report to be submitted to the Ministry of Environment consisting information on present situation as well as prospective activities and relevant measures to be undertaken for the rehabilitation of the present disposal site along with design concepts of a sorting plant, a compost plant and a final disposal site.
- Currently used final waste disposal sites as well as those closed must be indicated in urban development and landuse plans and no settlement action have to be permitted for those areas for the coming 30 and 40 years, respectively.
- Prior to surface coverage of closed dumpsites, necessary steps have to be undertaken for establishing a system required for gas absorption and outlet. The closed landfills must be periodically inspected and monitored.
- Garments worn by the personnel as well as the equipment and vehicles used throughout operations must be cleaned and disinfected regularly.

Supplementary to preceding legal obligations, following guidelines have to be precisely pursued for purposeful and efficient management of the sanitary landfill site as well as sorting and compost plants. At initial stage, a competent manager can be in charge of rehabilitation of present disposal site in Mersin. At consecutive stages, the responsibility of the landfill manager can either be extended to the management of the new sanitary landfill at Cimsa site as well as sorting and compost plants or another manager can independently be employed to be in charge of the latter assignments. The manager(s) must be contractually responsible to and supervised by the Environmental Health Department of the Mersin Greater Municipality.

b. Prime Operational Guidelines

- In the short run, the operation plan should be developed to guide sanitary landfill at Cimsa site and rehabilitation activities in present disposal site along with sorting and compost activities.
- At investments decision stage about the type of landfill equipment needed, following criteria should be referred:
 - functions related to soil (excavation, handling, compaction),
 - functions related to wastes (handling, compaction),
 - support functions (handling, spreading, covering)

along with systematic inspection and maintenance.

- At operation stages of the sanitary disposal, following steps need to be carefully pursued:
 - access control at gatehouse for control and record of details pertaining to each load and on-site orientation of vehicles for safe discharge (unloading),
 - waste placement by a tracked bulldozer in compliance with adopted storage techniques (working faces, cells) and compacting in accordance with envisaged material stratification system by applying appropriate layering operation (spread into thin layers),
 - application of soil cover regularly, preferably on daily basis (compact waste),
 - application of intermediate covers for unregular landfilling, final covers for completed landfilling and cell construction with sidewalks for new landfilling (cover waste).
- Throughout the operations, following duties have to be performed by aid of appropriate control mechanisms:
 - surface water management by perimeter and temporary drainage ditches and channels including inspecting, cleaning and maintaining,
 - fire control with diverse techniques applied actively and reactively,
 - pest control for avoiding public health risks,
 - litter control, particularly on windy days.
- Throughout the operations following duties have to be performed by aid of appropriate monitoring mechanisms:
 - leachate control and monitoring to keep clean surface and undergroundwater separated from the waste,
 - gas control and monitoring to avoid a potential risk created by flammable concentrations in the site.
- For proficient management of operations, a precise record-keeping is required composed of:
 - equipment maintenance records – a complete life story of each piece of landfill equipment,

- daily operational records – daily waste input received and placed as well as quantity of material used and time spent by machines and manual staff,
 - environmental monitoring records – gas emission and water quality assessments,
 - personnel records – employment details of manpower,
 - financial records – expenditures and revenues, budgets for prospective operations and investments.
- Throughout operations on the landfill site, a particular attention has to be paid for taking necessary measures related to occupational and environmental health. The essential items to be pursued for safe and healthy operations at the site are:
 - Informing and training the personnel on;
 - i. potential hazards associated with the activity
 - ii. safety precautions / personal protection equipment
 - iii. emergency procedures / medical assistance
 - iv. system for safe work practices
 - Instructing operators on specified system of work / personal hygiene and vehicular sanitation care.
 - Following a regular maintenance program for physical instalments against dangerous occurrences.

c. Prime Managerial Guidelines

For the fulfilment of above mentioned duties, the tasks and responsibilities of the landfill manager and the deputy manager / supervisor must be identified within the framework of a certain division of labour as indicated below. The landfill manager and the deputy manager / supervisor will be functioning as the contracted subordinate of the Environmental Health Department of the Greater Mersin Municipality.

Landfill manager: responsible for all matters concerned with the development, operation and completion of the landfill in accordance with operation plan. Primary duties include the following:

- planning of human, technical and financial resources for the proper operation and maintenance of the landfill, as well as
- preparation of forecasts for consideration of the Environmental Health Department of the Mersin Greater Municipality,
- fulfilment of the current and prospective requirements of the operations plans as approved by the Environmental Health Department of the Mersin Greater Municipality.
- recruitment of staff and procurement of equipment and materials within approved budgets to operate and maintain the landfill,
- development of detailed health and safety plan, emergency plan and environmental monitoring plan as extensions of the operation plan,
- assignment of tasks to site staff,

- training of the site staff,
- instruction of landfill supervisor on site operations and on environmental monitoring,
- review of daily and weekly reports prepared by the supervisor and others on site activities,
- preparation of monthly, quarterly and annual management information reports,
- salary payments as well as equipment and material purchases.

Deputy manager / operations supervisor: responsible for the daily activities on the landfill site in accordance with instructions received from the manager. Primary duties include the following:

- supervision of labour to control admission of wastes, movement of vehicles within the site, tipping in approved areas, compaction and covering of tipped waste,
- maintenance and supervisions of plants and vehicles,
- winning borrow material for use as daily, intermediate or final cover and stockpiling of cover material,
- supervision of housekeeping activities on site carried out by non-technical staff,
- preparation of daily and weekly activity reports,
- reporting to the manager any problem related to personnel, equipment, material, wastes inputs and public complaints.