## 13.3 Social and Economic Dimensions of the Project

### 13.3.1 Selection of the Priority Projects

Following the selection of the best scenario by Adana, the project was decided and agreed by the Turkish counterpart and the team.

- Introduction of a separate collection system
- Construction of a sorting plant
- Construction of a compost plant
- Construction of Sofulu MSW disposal site
- Construction of Sofulu medical waste disposal site

### 13.3.2 Targets of the Project

The project is part of the Phase 1 (2000 - 2005) improvements of the SWM M/P. The targets between 2002 and 2005 are summarised in the tables below.

Table 13-1: The Targets of the Project for Adana GM

| Components \ Phase | 1999 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|
| **1. MSW Generation** | | | | | |
| Population in Adana GM | **1,196,620** | **1,335,987** | **1,383,347** | **1,431,174** | **1,479,477** |
| Seyhan DM | 859,170 | 977,882 | 1,018,080 | 1,058,602 | 1,099,454 |
| Yuregir DM | 337,450 | 358,105 | 365,267 | 372,572 | 380,023 |
| MSW Amount (ton/year) | | | | | |
| Generation | 304,410 | 366,460 | 388,725 | 412,450 | 438,000 |
| Discharge | 293,095 | 355,145 | 377,410 | 401,135 | 426,685 |
| Collection | 284,700 | 348,992 | 372,005 | 396,477 | 422,774 |
| **2. Separate Collection** | | | | | |
| Separate collection rate to refuse collection (%) | 0 | 30 | 30 | 30 | 30 % |
| Separately collected amount (ton/year) | 0 | 104,697 | 111,602 | 118,943 | 126,832 |
| **3. Sorting plant** | | | | | |
| Amount treated (ton/year) | 0 | 39,785 | 44,641 | 48,766 | 54,538 |
| Amount recovered (ton/year) | 0 | 9,548 | 10,714 | 11,704 | 13,089 |
| Amount of residue (ton/year) | 0 | 30,237 | 33,927 | 37,062 | 41,449 |
| **4. Compost plant** | | | | | |
| Amount treated (ton/year) | 0 | 64,912 | 66,961 | 70,176 | 72,294 |
| Amount composted (ton/year) | 0 | 11,684 | 12,053 | 12,632 | 13,013 |
| Amount residue (ton/year) | 0 | 2,597 | 2,678 | 2,806 | 2,892 |
| **5. MSW Final Disposal** | | | | | |
| Amount disposed (ton/year) | 290,540 | 286,984 | 307,593 | 328,717 | 352,693 |
| Landfill volume ($m^3$/year) | 435,810 | 430,476 | 461,390 | 493,076 | 529,040 |
| **6. Medical Waste Final Disposal** | | | | | |
| Amount disposed (ton/year) | 1,606 | 1,898 | 2,008 | 2,117 | 2,263 |
| Landfill volume ($m^3$/year) | 4,130 | 4,881 | 5,163 | 5,444 | 5,819 |

### 13.3.3 Overall Site Development Plan

#### a. Fundamental Issues

The most important issue on the planning the site development is the fact that this site is still in use as a final disposal site. It is also necessary to consider the rehabilitation of the site used as an open dumpsite (partly conducted by the pilot project) . Although the Adana City Development Master Plan (City M/P) is being reviewed, the plan defined the site as a residential area. Further, the overall site development plan should fully consider the speed in which surrounding areas are becoming urbanised.

#### b. Overall Site Development Plan

An overall site development plan is summarised as follows:

- A 50m wide buffer zone (trees, plants) will be constructed along the ridge of the current disposal site catchment area to isolate the disposal site from the surrounding residents, and thereby ease resident opposition to the operation of the site.
- Landfill operations will be carried out at the catchment area (77 ha), i.e., inside the buffer zone. The compost and sorting plant will be also constructed inside the buffer zone.
- Because the target site slopes from north to south, the leachate treatment facility will be constructed at the southernmost end.
- The sorting and compost plant will be constructed on the highest section upstream where the land slopes gently, in consideration of the plant space required, and wastewater treatment system that will be introduced to the leachate drain.

### 13.3.4 Contents of the Project

The outline of the project is presented in the table below.

Table 13-2: Outline of the Feasibility Study

| Project | Outline | |
|---|---|---|
| Separate Collection | | 2002 -2005 |
| | ♦ Compactor Truck (16m$^3$) | 26-43 |
| | ♦ Tractor Trailer | 0 |
| | ♦ Lorry | 0 |
| | ♦ Collection Truck (Medical) | 2 |
| | ♦ Container (800 lit.) | 1731-2096 |
| Sorting Plant | ♦ Construction | : 2001 |
| | ♦ Operation Commencement | : 2002 |
| | ♦ Plant Capacity | : 190 ton/day |
| | ♦ Plant Type | : Manual sorting + Magnetic Separator |
| | ♦ Operation | : 300 day/year, 16 hour/day |
| | ♦ Raw Material | : Separated Non-compostable Waste |
| | ♦ Recovered Material | : Paper, Plastics, Glass, Ferrous metals, Non- ferrous Metals, Textile |

| Project | | Outline |
|---|---|---|
| Compost Plant | | • Construction : 2001<br>• Operation Commencement : 2002<br>• Plant Capacity : 250 ton/day<br>• Plant type : Aerated Static Pile<br>• Operation : 300 day/year, 16 hour/day<br>• Raw material : Separated Compostable Waste<br>• Compostable Content : 20.3 % by dry weight<br>• Moisture Content : 70 %<br>• Composting period : 28 day<br>• Maturation period : 60 day<br>• Compost Product Amount : 45.7 ton/day |
| Final Disposal | MSW | • Construction : 2001 (Phase 2) - Closure of Phase 1<br>• Operation Commencement : 2002<br>• Area Total : 95 ha<br>Phase 2 : 17 ha<br>Buffer zone : 25 ha<br>Others : 53 ha (Phase 1, Phase 3, Plant, Medical, etc.)<br>• Landfill Volume : 2,351,000 $m^3$ (Phase 2)<br>• Disposal Period : 2002 - 2006<br>• Leachate Control facility : Circulation + Evaporation |
| | Medical | • Construction : 2001<br>• Operation Commencement : 2002<br>• Area : 3 ha<br>• Landfill Volume : 48,000 $m^3$<br>• Disposal Period : 2002 - 2009<br>• Leachate Control Facility : Circulation + Evaporation |

### 13.3.5 Project Cost Summary

The estimated project costs are summarised in the table below.

Table 13-3: Cost Schedule of the Project for Adana GM

unit: US$ 1,000

| **ADANA** | | | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|
| Separate Collection System | Container | Invest | | 33 | 4 | 4 | 4 | 4 |
| | Compactor | Invest | | 1,664 | 320 | 384 | 384 | 384 |
| | | O&M for Compactor | | | 1,066 | 1,271 | 1,517 | 1,763 |
| Intermediate Treatment System | Sorting Plant | Design & Supervision | 199 | | | | | |
| | | Invest. for civil work | | 661 | | | | |
| | | Invest. for machine | | 2,597 | | | | |
| | | Invest. for V&E | | 435 | | | | |
| | | O&M | | | 446 | 446 | 446 | 446 |
| | Compost Plant | Design & Supervision | 365 | | | | | |
| | | Invest. for civil work | | 1,208 | | | | |
| | | Invest. for machine | | 4,570 | | | | |
| | | Invest. for V&E | | 1,000 | | | | |
| | | O&M | | | 549 | 549 | 549 | 549 |

| ADANA | | | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|
| Final Disposal System | Municipal Waste | Design & Supervision | 1,007 | | | | 191 | |
| | | Invest. for civil work | | 10,790 | | | | 13,676 |
| | | Invest. for V&E | | 1,691 | | | | |
| | | O&M | | | 331 | 331 | 331 | 331 |
| | Medical Waste | Design & Supervision | 48 | | | | | |
| | | Invest. for civil work | | 972 | | | | |
| | | Invest. for V&E | | 341 | | | | |
| | | O&M | | | 23 | 23 | 23 | 23 |

Note V&E: Vehicles and Equipment

## 13.3.6 Project Evaluation

### a. Technical Evaluation

Technical systems of the project comprise:

1. Introduction of a separate collection system
2. Construction of a sorting plant
3. Construction of a compost plant
4. Construction of Sofulu MSW disposal site
5. Construction of Sofulu medical waste disposal site

The technical evaluation assesses the feasibility of this project, with reference to the present technical capabilities of the target area.

### a.1 Separate Collection System

The introduction of a separate collection system will be difficult, for mixed collection is currently practised in the target areas. To overcome this difficulty, separate collection will be introduced gradually, first in areas where the system can be easily implemented. In the F/S, areas like GSHC - a pilot project area in Mersin - are prioritised, and the aim is to increase the practice to cover30% of the population by 2005.

Based on the pilot project in Mersin, it is concluded that properly explaining to the residents the objectives, the methods, and the degree of public co-operation required from them would ensure the feasibility of introducing the separate collection system. The pilot project verified the feasibility as non-compostable waste in compostable waste is only less than 10%. By modifying the contents to suit the conditions in Adana GM, the education book produced to promote the pilot project is also an indispensable tool in gaining very effective public participation.

In conclusion, the gradual introduction of the separate collection system would be very feasible by making full use of the experiences gained from the pilot project in Mersin, .

### a.2 Sorting and Compost Plant

Because there is no compost plant in Adana GM, therefore the municipality is naturally inexperienced with the aspects involved in the construction of one, e.g., technology. Mersin, on the other hand, is one of the municipalities in Turkey with

some experience in the construction and operation of plants, but none of the plants are successfully operated. The sorting facilities that are constructed in some cities are very simple in structure, and different from what this study proposes. In the planning, the design, the construction, and the operation of the sorting and compost plant, therefore, an experienced consultant and a plant manufacturer from advanced nations should be contracted, on condition that they enter a joint venture with local firms. This would facilitate the transfer of the relevant techniques and know-how to local firms.

Excluding the plastic bag breaker for the sorting plant and the selective crushing separator (SCS) for the compost plant, all relevant equipment can be procured locally, and would therefore eliminate any problems acquiring spare parts and in maintenance. The plastic bag breaker and the SCS will be imported, but since the structure of both equipment is simple, there should be no problems especially with the transfer of techniques required to operate and maintain these equipment. In terms of acquisition of spare parts and maintenance, the setting up of a local agency could overcome any problem.

### a.3 MSW and Medical Waste Disposal Site

The local construction firms are fully capable of developing the MSW and medical waste disposal sites. The disposal sites in Turkey, however, do not carry out sanitary landfilling as stipulated by the SWM and the Medical Waste Control Regulations of MoE. A consultant from an advanced country that is fully experienced in the planning, the design, the construction, and the operation of a sanitary landfill will be contracted, and work hand in hand with a local firm in consideration of technology transfer.

There should be no problems the procurement of the equipment necessary for the operation of the MSW and medical waste disposal sites, as all the necessary resources are available locally.

### b. Social Evaluation

The project would incur various social impacts, however, only the intangible social impacts were evaluated.

***Negative Impacts:***

- Loss of livelihood for scavengers.
- Rise in cleansing tax rates.

***Positive Impacts:***

- Improvements in sanitary conditions and public health of the Sofulu dumpsite surrounding area
- Promotion of investment and tourism.
- Increase in land value.

### b.1 Measures to Mitigate Negative Impacts

***Loss of Livelihood for Scavengers***

The project proposes to prohibit the entry of unauthorised persons into the disposal site from 2002 so that the sanitary landfill can operate effectively. If this is enforced this will deprive the scavengers who work in the dump site of their livelihood. To prevent this situation Adana GM may request the operator of the sorting plant to hire scavengers as sorting workers.

***Rise in Cleansing Tax Rates***

The project proposes to raise the present cleansing tax rate; the cleansing tax rise will increase the revenue for SWM services. A higher revenue is required to implement the proposed projects. Although this would increase the financial burden of the citizens, the following considerations are taken into account to minimise the negative impacts.

a) To introduce a cross-subsidy mechanism (i.e., the affluent pays for the less well off).

b) To maintain the cleansing tax rate in 2005 at less than four times the residents' current willingness to pay.

c) To keep the proposed rate below 1.0% of the resident's income.

The table below compares these amounts.

Table 13-4: Ratio of Cleansing Tax to Income

| | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|
| Average annual household income (US$/year)*1 | 8,750 | 8,880 | 9,010 | 9,150 |
| Cleansing tax per household (US$/year) | 8.3*2 | 15.0 | 15.1 | 30.2 |
| Ratio of cleansing tax (%) to income | 0.09 | 0.17 | 0.17 | 0.33 |

Note: *1 Calculated assuming that the increase is in proportion to the per capita GRDP.
*2: Amount of willingness to pay from POS

The WTP is far below 1 % of the average income, and, assuming that residents can afford to pay more, the project proposes a cleansing tax rate higher than the amount they are willing to pay (US$ 8.3 /year).

### b.2 Positive Impacts

***Improvements in sanitary and public health conditions of the area surrounding Sofulu dumpsite***

The project will bring various benefits; the current open dumping operation adversely affects Sofulu dumpsite and its surrounding area to a significant degree. Consequently, residents from adjacent areas frequently complain about these unfavourable conditions, and therefore strongly oppose use of the site. These adverse impacts will considerably be mitigated by the implementation of sanitary landfill operation. The implementation of the project, therefore, will improve the sanitary and

public health conditions of the areas surrounding Sofulu dumpsite, and ease resident opposition to the operation of the disposal site. In particular fire outbreaks, which affects not only the surroundings, but also the city centre, will be eliminated completely.

***Promotion of Investment and Tourism***

In addition to the health effects, separate collection, promotion of government related recycling by constructing sorting and compost plants, and proper disposal of wastes will provide Adana GM with a favourable environment that would eventually promote investment and tourism. Since Adana GM is the centre of economic and social activities in the Cukurova region, the improvement of its environment will enhance its image and eventually contribute to attracting more investors and tourists to the area.

***Increase in Land Value***

A well-managed waste disposal operation will improve the living environment, which in turn will increase the value of the land in the area. A study on the relationship between the living environment and land value suggests that, other factors held constant, housing values with distance from a landfill rise at an average rate of 6.2 % a mile within a two-mile radius of the landfill, presumably because the environmental and aesthetic problems associated with living near a landfill diminish as distance from it increases[1]. Thus, the implementation of projects, sanitary landfill operation, etc., increases the land value around the present Sofulu disposal site.

## c. Financial Evaluation

### c.1 Financial Evaluation Method

Financial evaluation is carried out to determine whether both the cleansing service management and the financial plan can be realised within the financial capacity of the agency in charge. Although several agencies are involved with cleansing services, the evaluation of the financial state of each agency would be difficult. Here, an overall financial evaluation of the cleansing service in the target area, consisting of Adana GM, Seyhan DM, and Yuregir DM, is carried out in accordance with the conditions shown in the table below.

Table 13-5: Conditions for Financial Evaluation

| | |
|---|---|
| Executing Body | **Waste collection and public area cleansing services:**<br>• GM, DMs and private contractors<br>**Sorting plant, compost plant, and disposal site:**<br>• Planning and monitoring by the GM<br>• Operation by private contractors |
| Evaluation Period | 17 year period, from 2000 to 2016 |
| Revenue | **Revenues**:<br>• cleansing tax<br>• budget allocation from general finances of the DM and the GM<br>• sale of recoverables and compost<br>• tipping fee for direct haulage and medical waste<br>The revenue in 2005 will be adopted for the period from 2006 to 2016. |

[1] Beede, D.N. and Bloom, D.E. 1995, The Economics of Municipal Solid Waste, The World Bank

| | |
|---|---|
| Investment Cost | The following investment costs until 2005 is considered:<br>• introduction of a separate collection system<br>• construction of a sorting plant<br>• construction of a compost plant<br>• development of an MSW disposal site<br>• construction of a medical waste disposal site<br>The renewal investment costs are also considered until 2016 according to the life span. |
| Operation Cost | The estimated cost is adopted until 2005. The expenditures adopted for 2006 to 2016 are as in 2005. |
| Salvage Value | The salvage value of vehicles, machinery and equipment in 2017 was taken into account. |
| Cut-off Rate | The standard discount rate (8%) used by the European Development Bank and World Bank is applied. |
| Price Increase | The prices for 1998 is adopted in the financial evaluation; price increase is not considered. |

### c.2 Case Studies

Case studies are conducted using the following parameters. There are 25 case studies in total.

- Cleansing tax: Tax rate (tariff) and year to increase the rate.
- SWM budget allocation from general financial sources (municipal budget) other than cleansing tax: Rate
- Central government subsidy: Rate
- Reduction in expenditure: Rate

In order to implement these case studies the following conditions were established:

***Cleansing tax***

The following assumptions were made to examine the cleansing tax rate and the year to increase the rate:

- The tax collection rate will be increased to 90 % in 2002.
- Number of cleansing tax payers for waste generated by households will increase in proportion to the population, and for enterprises waste will increase with GRDP.

***SWM budget allocation from general financial sources***

The present SWM budget allocation rates from general financial sources of municipalities were estimated by the team as follows:

Adana GM: 5 %

Seyhan and Yuregir DMs: 20 %

The general financial source growth rate in real terms by 2005 is also estimated at 1.3 times the 1998 figure.

***Central government subsidy***

In Turkey, investment comes from either foreign loans or central government subsidies. Municipalities repay foreign loans with interest. Since SWM service is not profitable, a soft loan is favourable. The team advocates an OECF loan as a foreign load for the investment required in 2000 and in 2001; it is repayable in 25 years, has a 7 year grace period, and an interest rate of 2.2%

***Reductions in expenditure***

In order to achieve a sound financial state, expenditure shall be reduced by:

- reviewing the construction cost estimated by the team at the detailed design stage of the design of the landfill's slope liner, the need for a liner, etc.
- reducing operation cost by contracting out the plant operation and properly managing the administration cost.

### c.3 Overall SWM Costs

The overall SWM costs needed for the implementation of the project (target year: 2005) are summarised in the following table.

Table 13-6: Cost Summary for Financial Evaluation of Project

unit: US$ 1,000

| Items | | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | Total |
|---|---|---|---|---|---|---|---|---|
| Investment | Separate Collection | 0 | 1,697 | 324 | 388 | 388 | 388 | 3,185 |
| | Sorting Plant | 199 | 3,693 | 0 | 0 | 0 | 0 | 3,892 |
| | Compost Plant | 365 | 6,778 | 0 | 0 | 0 | 0 | 7,143 |
| | Final Disposal Site | 1,007 | 12,481 | 0 | 0 | 156 | 11,154*5 | 24,798 |
| | Medical WDS | 48 | 1,313 | 0 | 0 | 0 | 0 | 1,361 |
| | Sub-total | 1,619 | 25,962 | 324 | 388 | 544 | 11,542 | 40,379 |
| O & M Costs | Separate Collection | 0 | 0 | 1,066 | 1,271 | 1,517 | 1,763 | 5,617 |
| | Sorting Plant | 0 | 0 | 446 | 446 | 446 | 446 | 1,784 |
| | Compost Plant | 0 | 0 | 549 | 549 | 549 | 549 | 2,196 |
| | Final Disposal Site | 3,125*2 | 3,362*2 | 331 | 331 | 331 | 331 | 7,811 |
| | Medical WDS | 0 | 0 | 23 | 23 | 23 | 23 | 92 |
| | Administration* | 770 | 821 | 930 | 949 | 971 | 993 | 5,434 |
| | Sub-total | 3,895 | 4,183 | 3,345 | 3,569 | 3,837 | 4,105 | 22,934 |
| Existing System | Collection & Haulage*3 | 8,541 | 9,176 | 7,957 | 7,957 | 7,957 | 7,957 | 49,545 |
| | Public Area Cleansing*4 | 3,737 | 3,876 | 4,017 | 4,160 | 4,303 | 4,449 | 24,542 |
| | Sub-total | 12,278 | 13,052 | 11,974 | 12,117 | 12,260 | 12,406 | 74,087 |
| Overall SWM expenses | | 17,792 | 43,197 | 15,643 | 16,074 | 16,641 | 28,053 | 137,400 |
| Overall SWM costs | | 16,173 | 17,235 | 19,524 | 19,933 | 20,394 | 20,858 | 114,117 |

Note: * 1 5% of the overall SWM expenses (inclusive of depreciation cost)
*2 Calculated based on US$10/ton
*3 Calculated based on US$30/ton
*4 Calculated based on US$186/ton
*5 Modified the investment cost according to the disposal volume after 2006 assumed to be equivalent to the volume of 2005 for the financial evaluation.

The overall SWM cost for 2005, calculated by converting the project investment cost into the depreciation cost, is US$20.9 million – 2 times the overall SWM expenses (US$10.7 million) at present.

### c.4 Conclusion of the Financial Evaluation

Of the 25 case studies the financial evaluation concludes the case consisting of the following parameters as recommendable.

***Cleansing Tax***

- Raise the cleansing tax fee, in real terms, to1.8 times the 1998 rate in 2003.
- Further raise the cleansing tax rate in 2005, aiming to provide 50% of the SWM cost including depreciation costs.(i.e., double the above rate, or 3.6 times the 1998 rate)

***SWM Budget Allocation***

- Raise the SWM budget allocation from general financial sources (excluding cleansing tax) to 1.1 times the 1998 rate in 2003.

***Central government subsidy***

- Acquire a central government subsidy equivalent to 20 % of the investment for 2000 and 2001.

If the above requirements are satisfied, the implementation of the project will be financially feasible because the FIRR is slightly over the cut off rate at 8.3 %.

The cash flow of the recommended case is shown in the figure below.

Although this case would incur a financial deficit until 2002, covering all the cleansing service expenses (including depreciation) until 2005 would be possible. There will be a reserve of US$ 11 million by the end of 2005 making it possible to cover the renewal costs of vehicle and equipment after 2006.

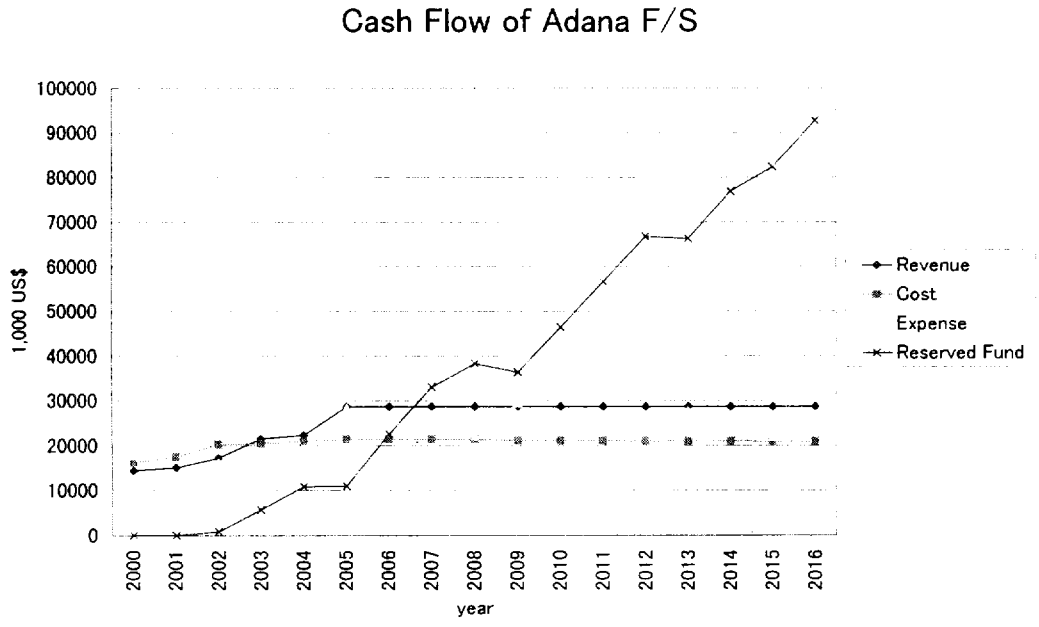


Figure 13-4: Cash Flow Diagram for Recommended Case

## d. Economic Evaluation

### d.1 Economic Evaluation Method

Economic evaluation is carried out to determine the necessity of the project in view of the present national economic conditions. Because environmental benefits are difficult to quantify, economic evaluation is mostly limited to cost minimisation methods and qualitative evaluation. With resource-recovery and disposal site cost reduction as the benefits that can be expected from the introduction of an intermediate treatment facility, a comparison is made between costs and benefits of a project that has (*with-project*) and that does not have (*without-project*) the introduction of such facility.

In this study, the proposed project objectives are as follows:

- Promote resource recovery and reduction of disposal amount through the construction of a sorting plant and compost plant.
- Introduce separate collection to improve compost quality.

Taking the above into consideration, the evaluation of the project is carried out as follows.

Table 13-7: Economic Evaluation Method

| | Collection & Public Area Cleansing | Intermediate Treatment | Final Disposal |
|---|---|---|---|
| Evaluation Method | Qualitative Evaluation | Quantitative Evaluation (Cost-benefit Analysis) Qualitative Evaluation | Qualitative Evaluation |
| Evaluation Period | | 17 years (2000-2016) | |

The benefits and costs of the quantitative evaluation are as shown in the table below.

Table 13-8: Benefits and Costs

| | Intermediate Treatment |
|---|---|
| Benefits (B) | • Resource recovery (Recoverables and compost)<br>• Reduced disposal cost<br>• Reduced haulage cost<br>• Effective land use |
| Costs (C) | The following were converted into economic cost:<br>• Investment cost and O&M cost of separate collection<br>• Investment cost and O&M cost of sorting plant<br>• Investment cost and O&M cost of compost plant |
| Evaluation Standard | EIRR > 8 % |

The benefits and O&M costs in 2005 will be used for the benefits and O&M costs in 2006 - 2016. As in the financial evaluation, the investment required for vehicle and equipment renewal is considered in the investment cost. In addition, the salvage value in 2016 is calculated as a negative cost in 2017.

### d.2 EIRR Calculation Results

Based on the above costs and benefits the EIRR is 6%. The benefits of resource recovery include abstract environmental benefits, such as reduced environmental $CO_2$ loads, therefore there may be some disputes when the project benefit is evaluated using market prices. If the benefit from resource recovery is valued at 1.2 times its market price, the EIRR is 10%, and therefore above the cut off rate.

### d.3 Qualitative Evaluation

***Intermediate Treatment***

Although some of the benefits can be quantified, this alone is insufficient to present an overall benefit required to fulfil the established evaluation criteria for the project's feasibility.

As the world's awareness of the importance of global environmental preservation intensifies, the effects of resource recovery through the construction of a sorting plant and a compost plant would widely surpass the benefits measured quantitatively.

The following are also some of the effects that is considered to result from resource recovery:

- Soil conditioning by compost use
- Creation of jobs from the operation of the sorting plant
- Improvements in resource recovery activities
- $CO_2$ reduction due to energy conservation

In view of these impacts, therefore, the need to implement the proposed project is fully justified.

***Final Disposal***

The adequate disposal of hauled waste prevents adverse environmental impacts.

The improvement of the present Sofulu disposal site may have the following impacts:

- Improvements in public health and in environment around the disposal site
- Prevention of leachate runoff to outer areas by adopting a circulation process
- Reduction in haulage costs

To counteract any risk that may result from handling or unexpected contact with contagious materials, the development of a medical waste disposal site is of extreme importance. This undertaking will not meet any opposition as this would actually contribute to eliminating the fears and worries of the surrounding residents.

Based on the above qualitative evaluation the project is deemed feasible.